Graduate Weather and Storm Spotter Class

Kevin Laws

Meteorologist

Please dial 1-866-231-8384

Passcode: 2056215645#

For the audio.

U.S. Department of Commerce

National Oceanic and Atmospheric Administration

National Weather Service – Birmingham, AL

Questions or Comments?

Email:

John DeBlock – john.deblock@noaa.gov

Kevin Laws – kevin.laws@noaa.gov

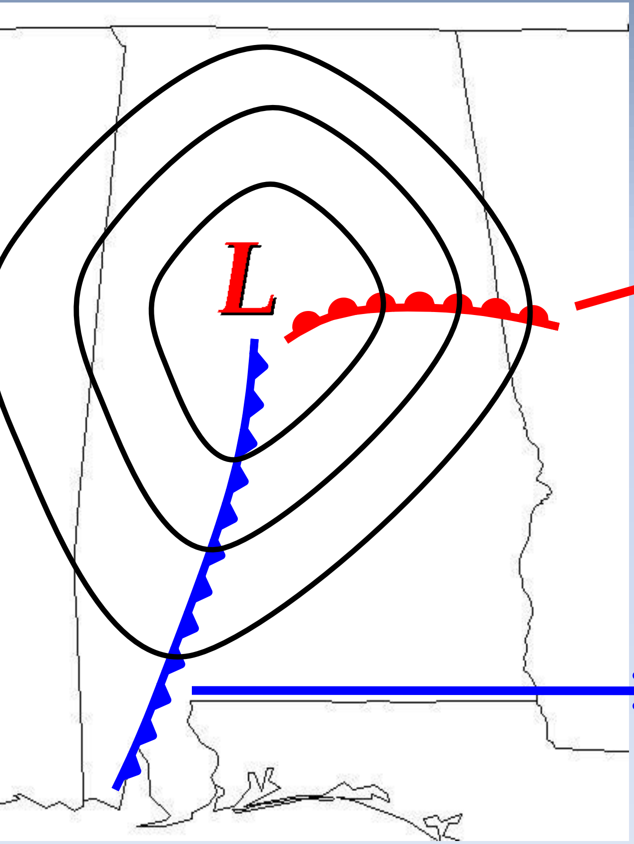
A survey will follow this presentation, please submit feedback so we can improve this presentation!

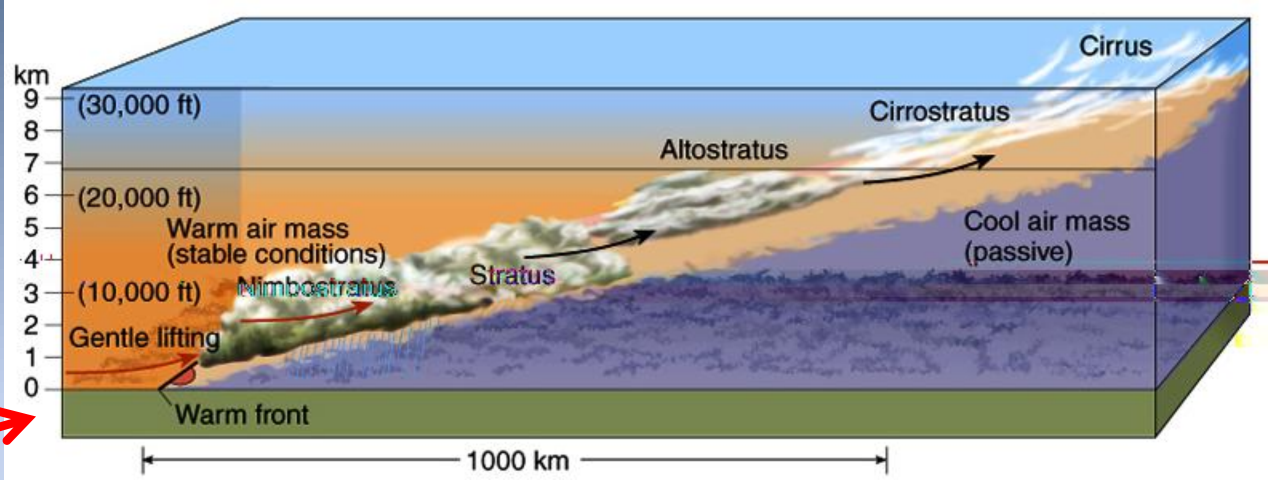
Welcome to the Graduate Spotter Class

What we will attempt to cover in this class:

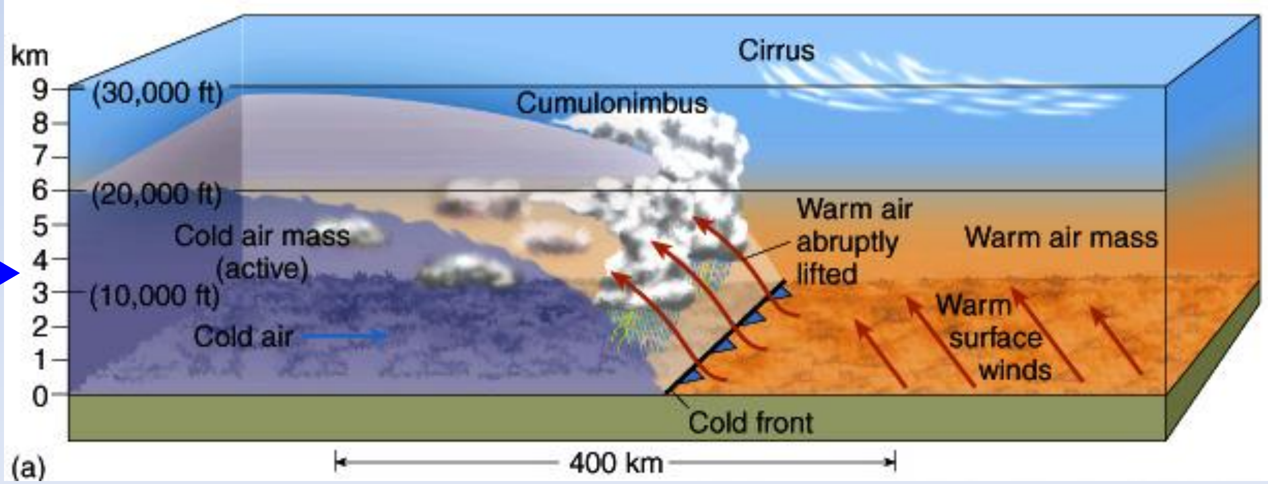
- Advanced weather concepts including a 3-D look at the atmosphere.
- Instability versus Wind Shear – Finding the perfect balance. How do you arrive at the mode of convection in the forecast?
- The ‘why’ of what you observe when storm spotting.
- Spotting recognition quiz
- Warning scenario: what we see from the NWS perspective and why we need effective spotter reports.

The 3-Dimensional Atmosphere



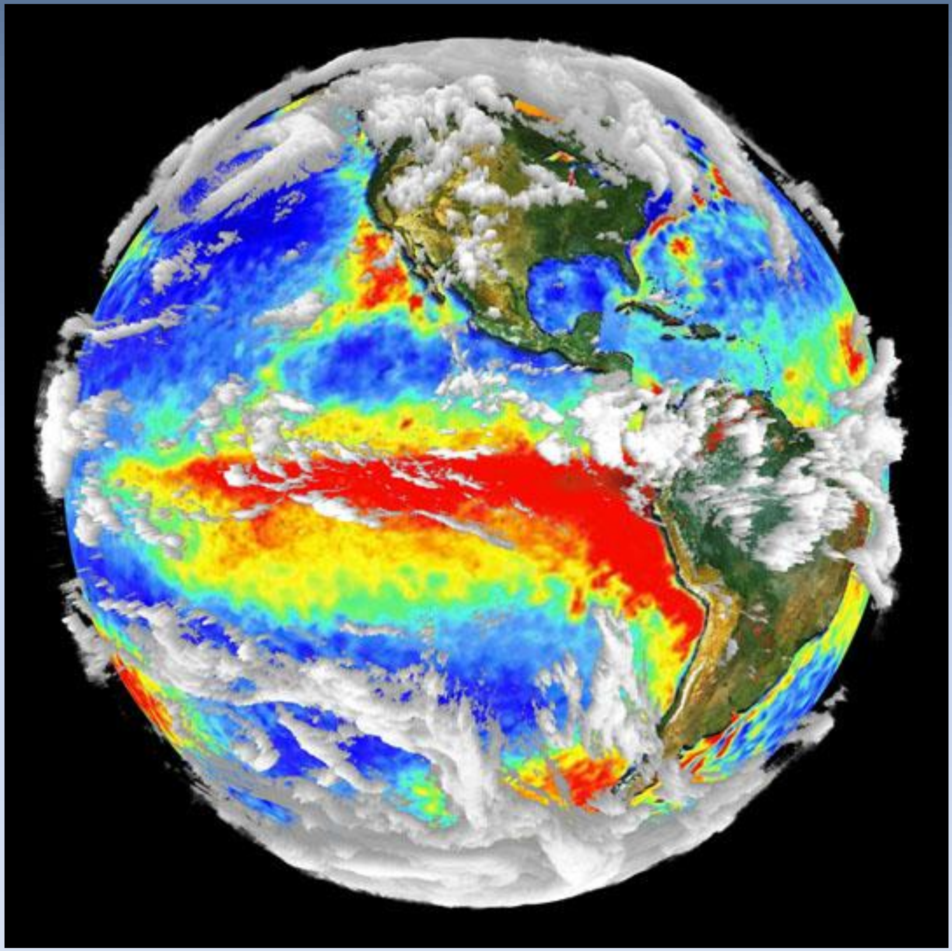


Warm Front



Cold Front

The 3-Dimensional Atmosphere



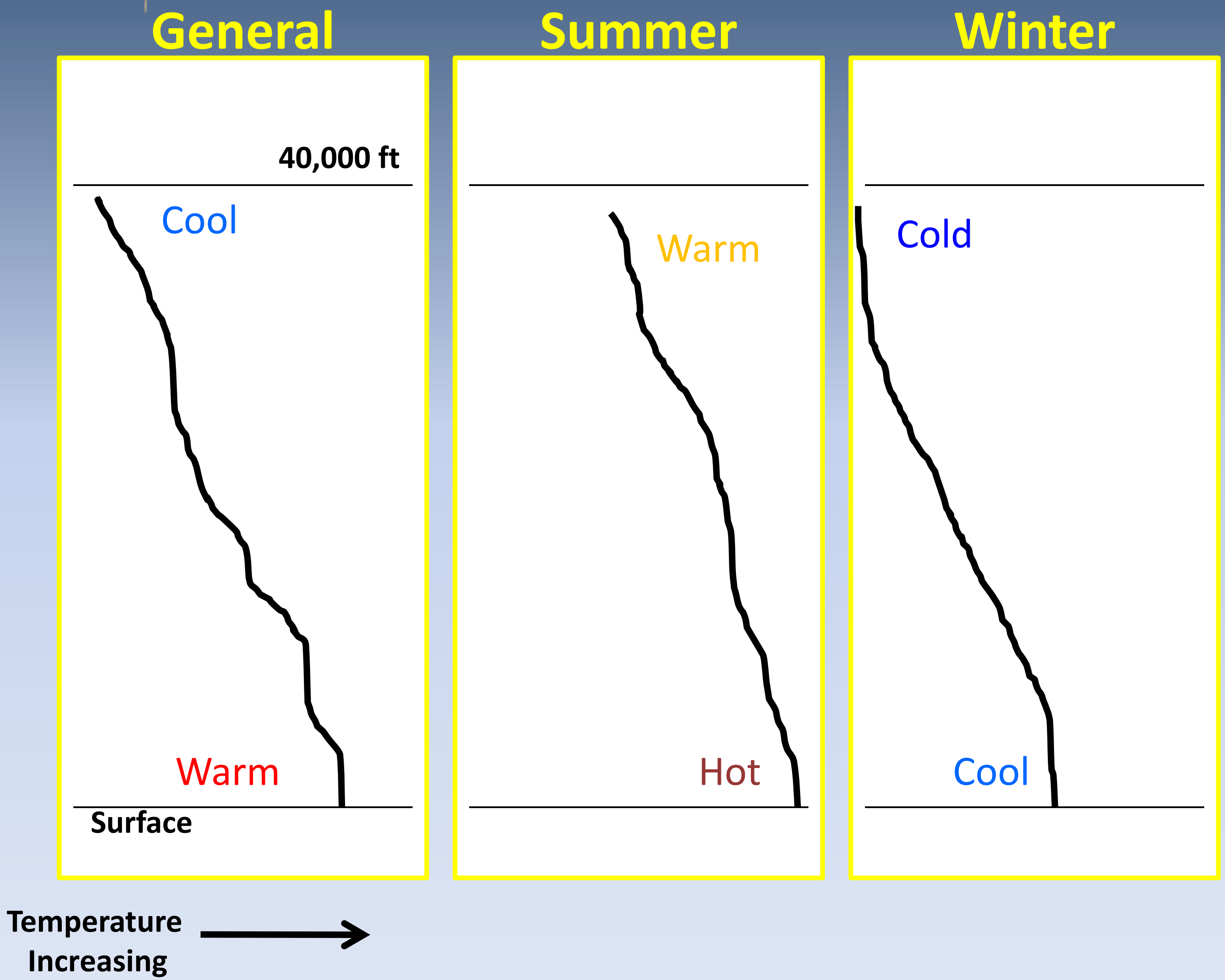
Thunderstorms

- Instability
- Moisture
- Lift Mechanism

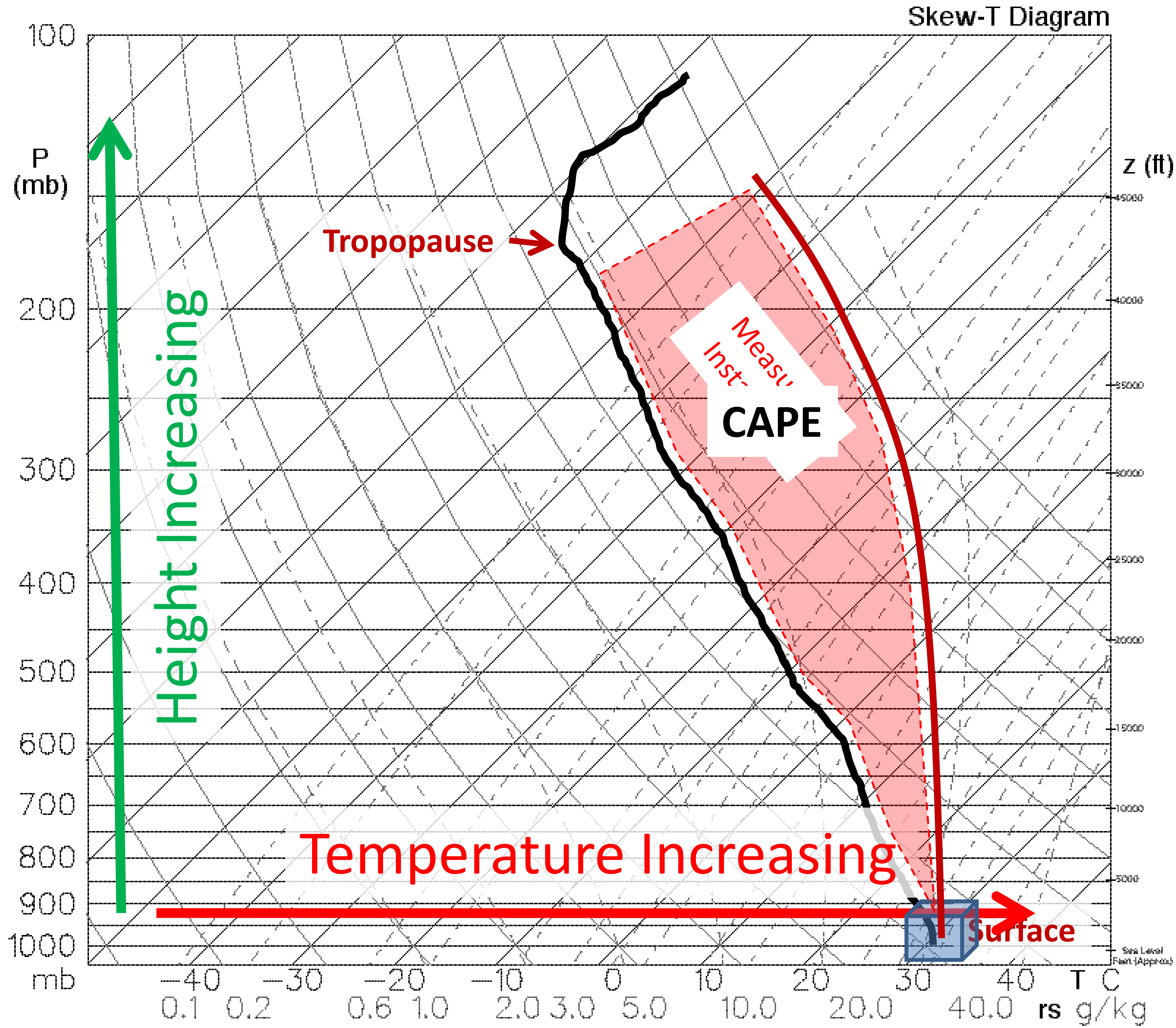
Severe

- Instability
- Wind Shear

The 3-Dimensional Atmosphere Instability



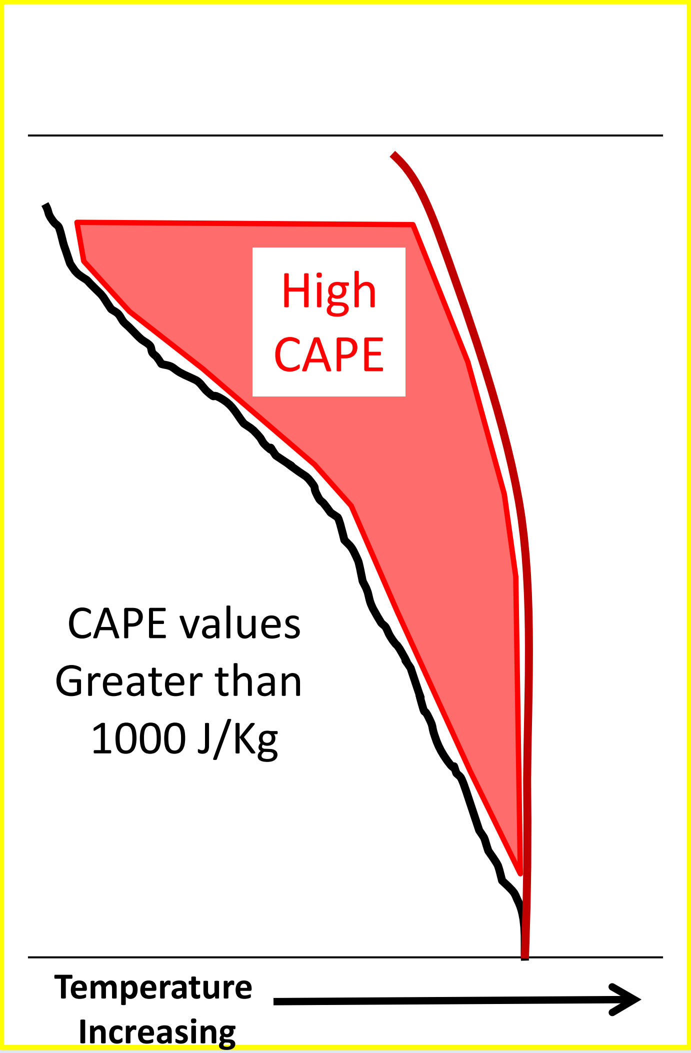
- In basic terms, the instability of the atmosphere is measured based upon how warm it is at the surface versus how cold it is aloft.
- In general, the atmosphere gets colder as you go up.
- During the summer, it is a lot hotter at the surface, but it also warm aloft
- In the winter it is colder at the surface, but it is also colder in the upper atmosphere, as well.
- How is the instability calculated?



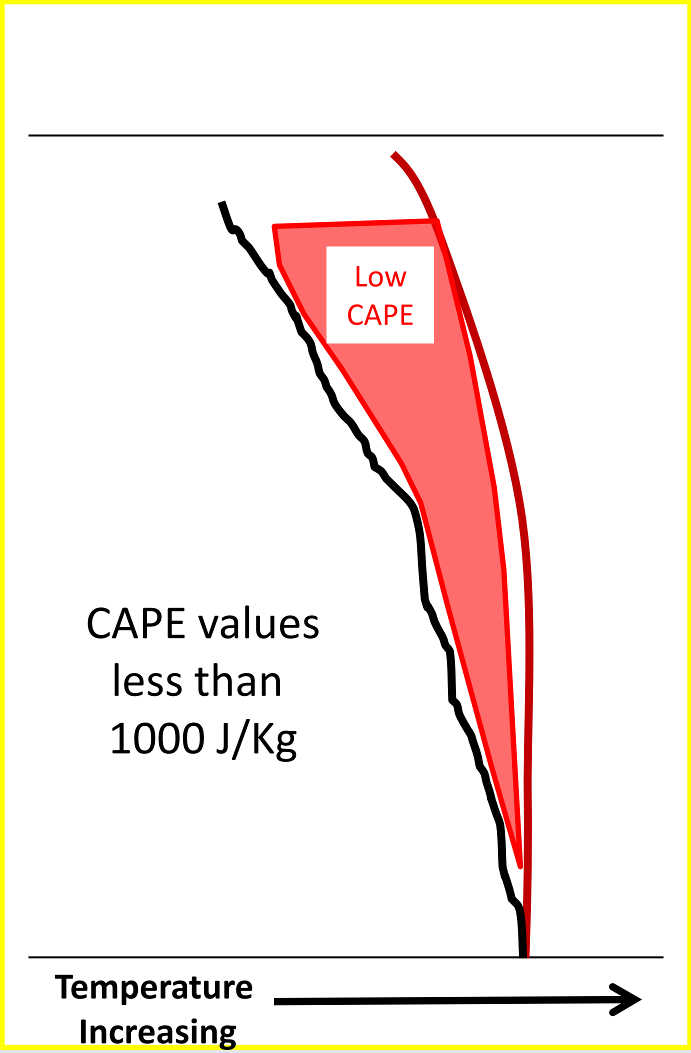
Skew-T Diagram
P (mb)
z (ft)
Tropopause
Height Increasing
CAPE
Temperature Increasing
Surface
100
200
300
400
500
600
700
800
900
1000
mb
-40
-30
-20
-10
0
10
20
30
40
T C
0.1 0.2 0.6 1.0 2.0 3.0 5.0 10.0 20.0 40.0
rs g/kg

The 3-Dimensional Atmosphere Instability

Hot Surface/Cold Aloft

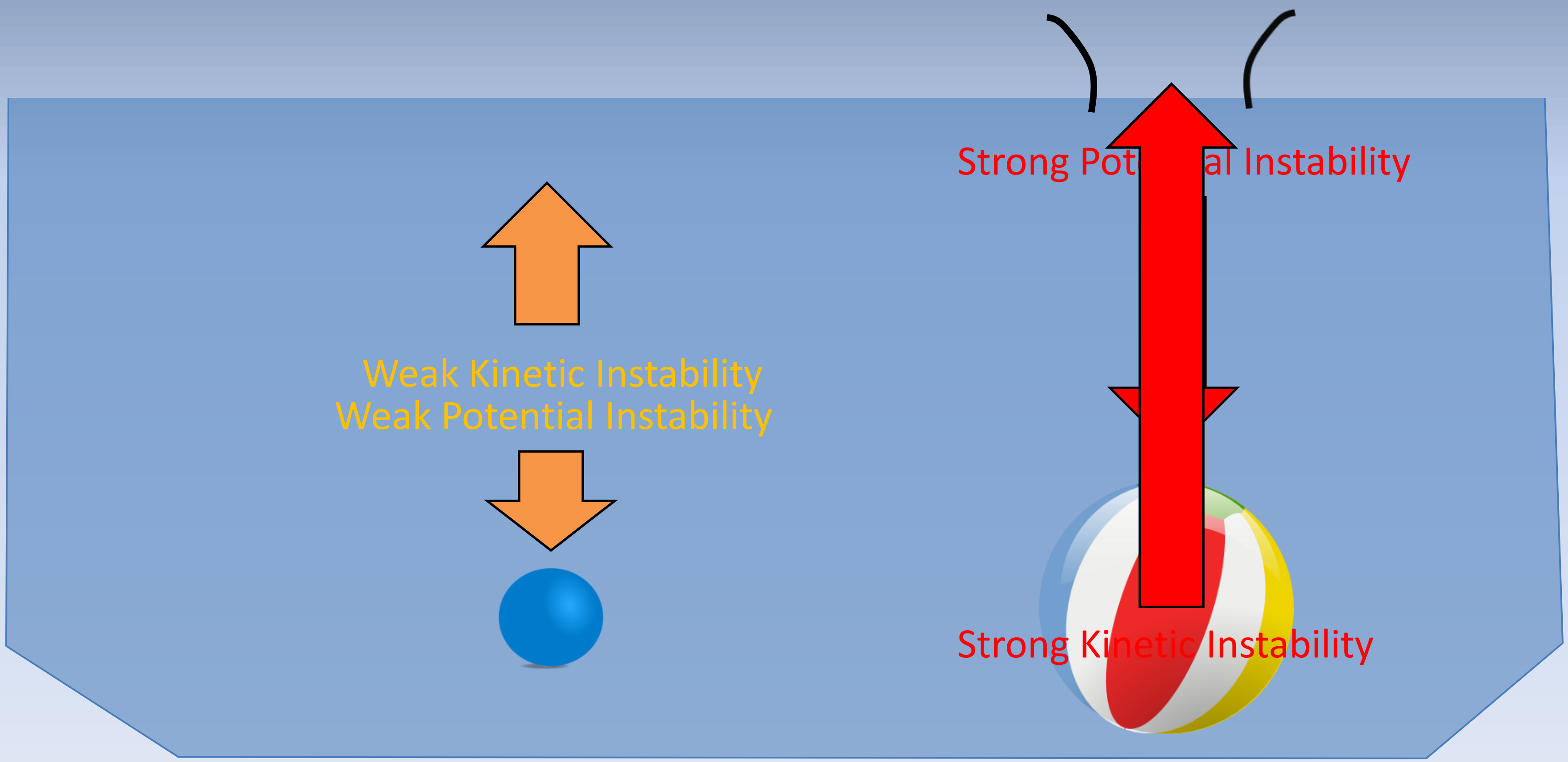


Hot Surface/Warm Aloft

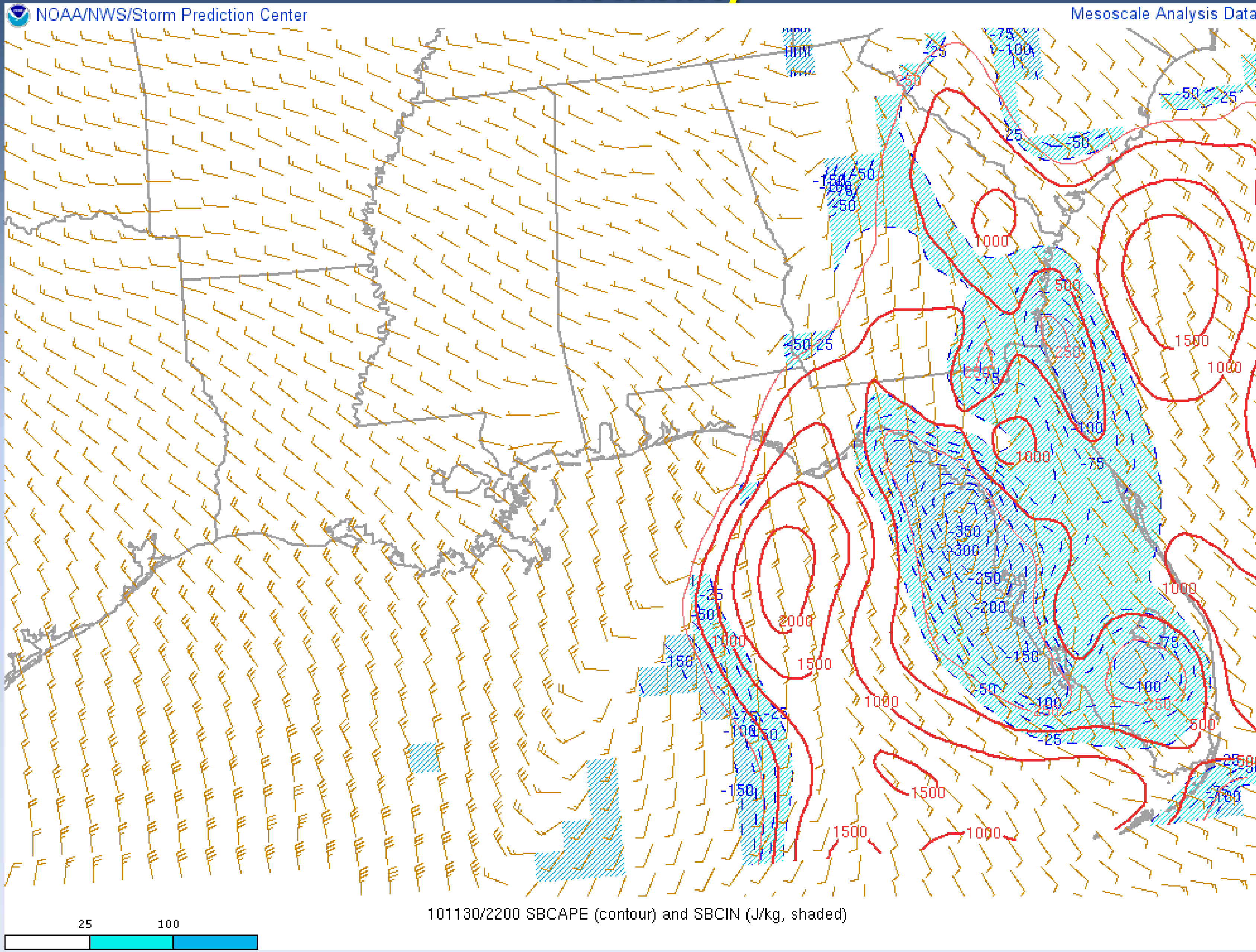


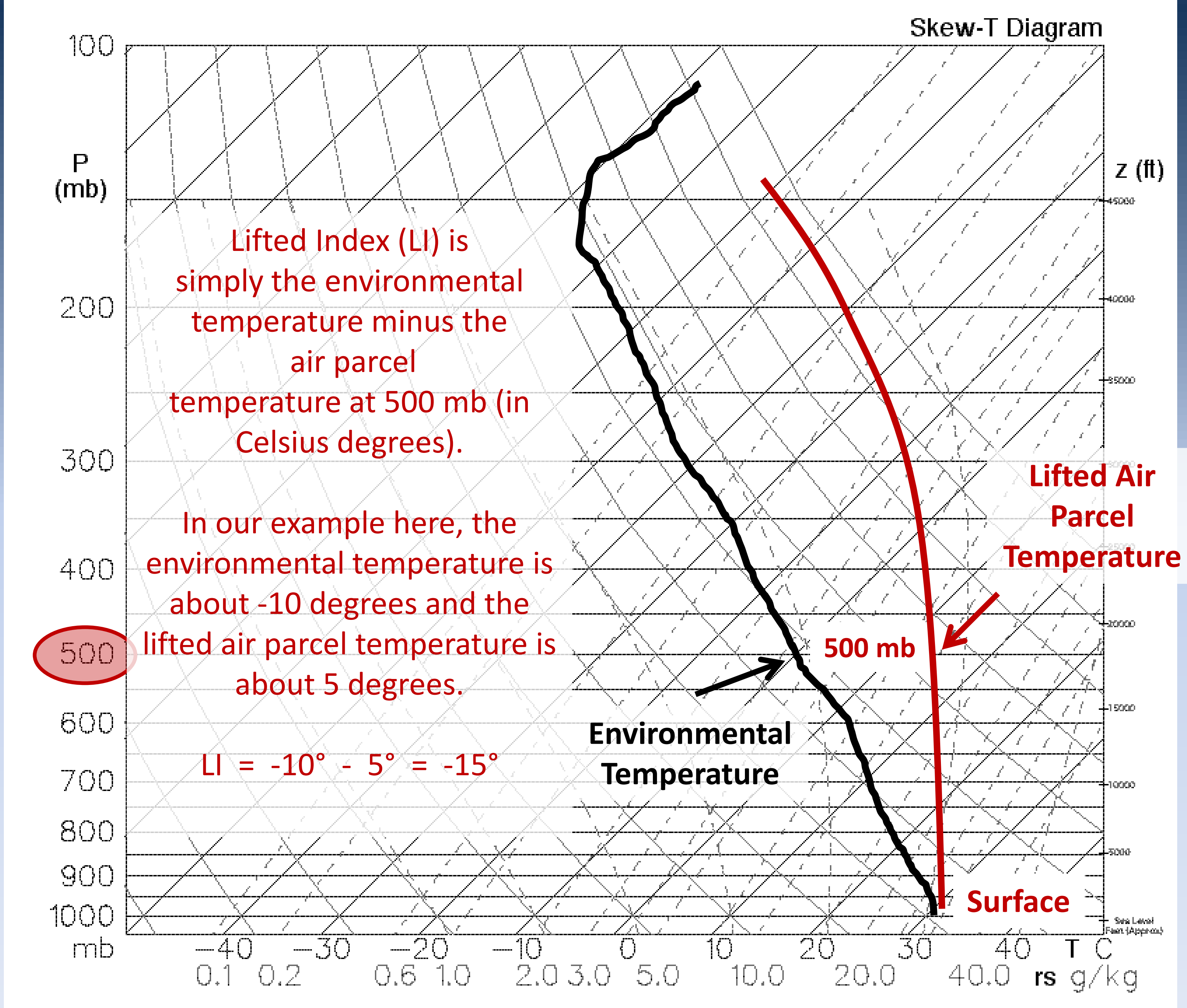
- CAPE stands for the Convective Available Potential Energy
- Depending on what type of CAPE exists (tall, short, skinny, fat) will determine the type and amount of thunderstorms that are possible (potential).

The 3-Dimensional Atmosphere
Instability

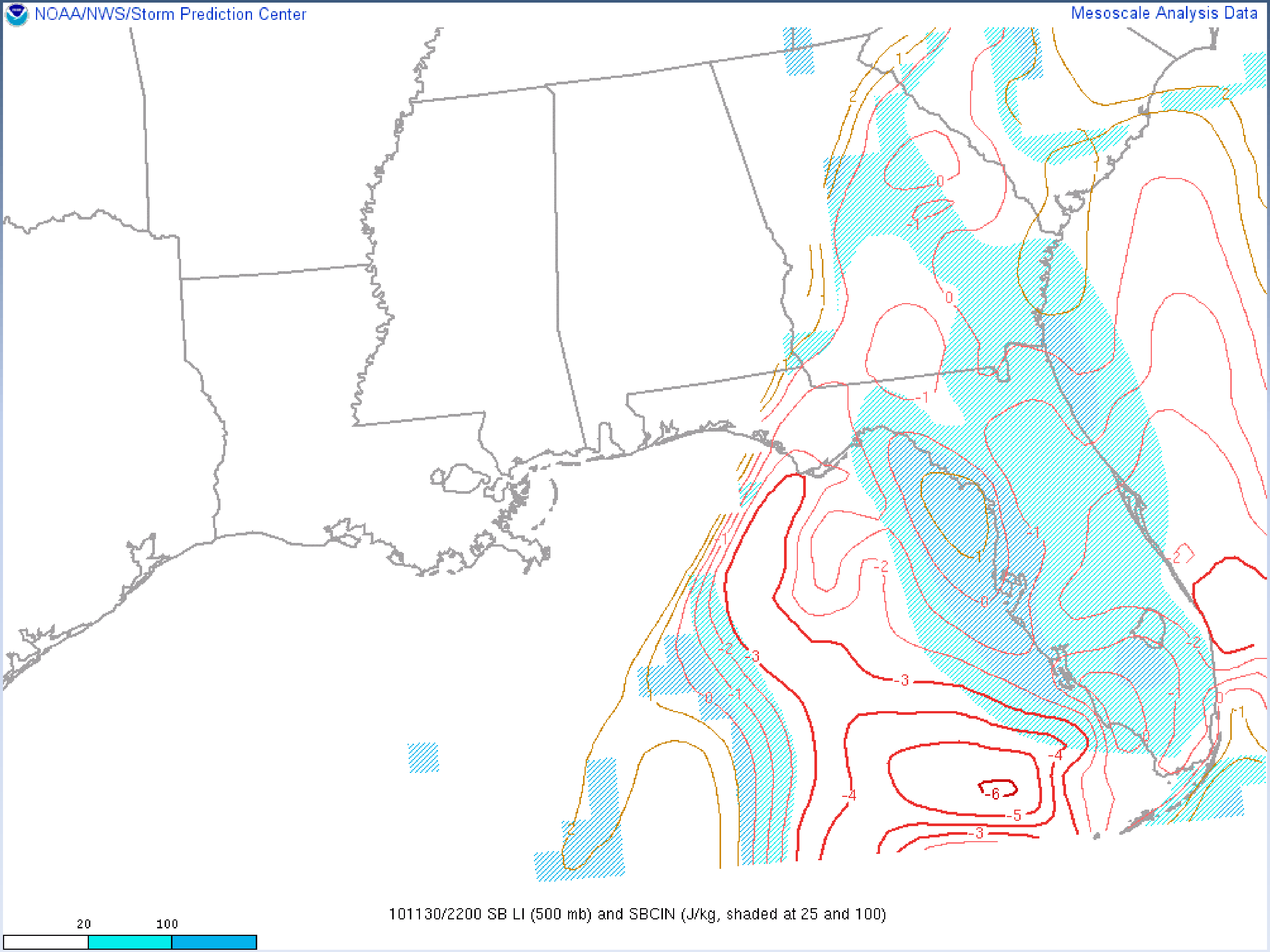


The 3-Dimensional Atmosphere
Instability

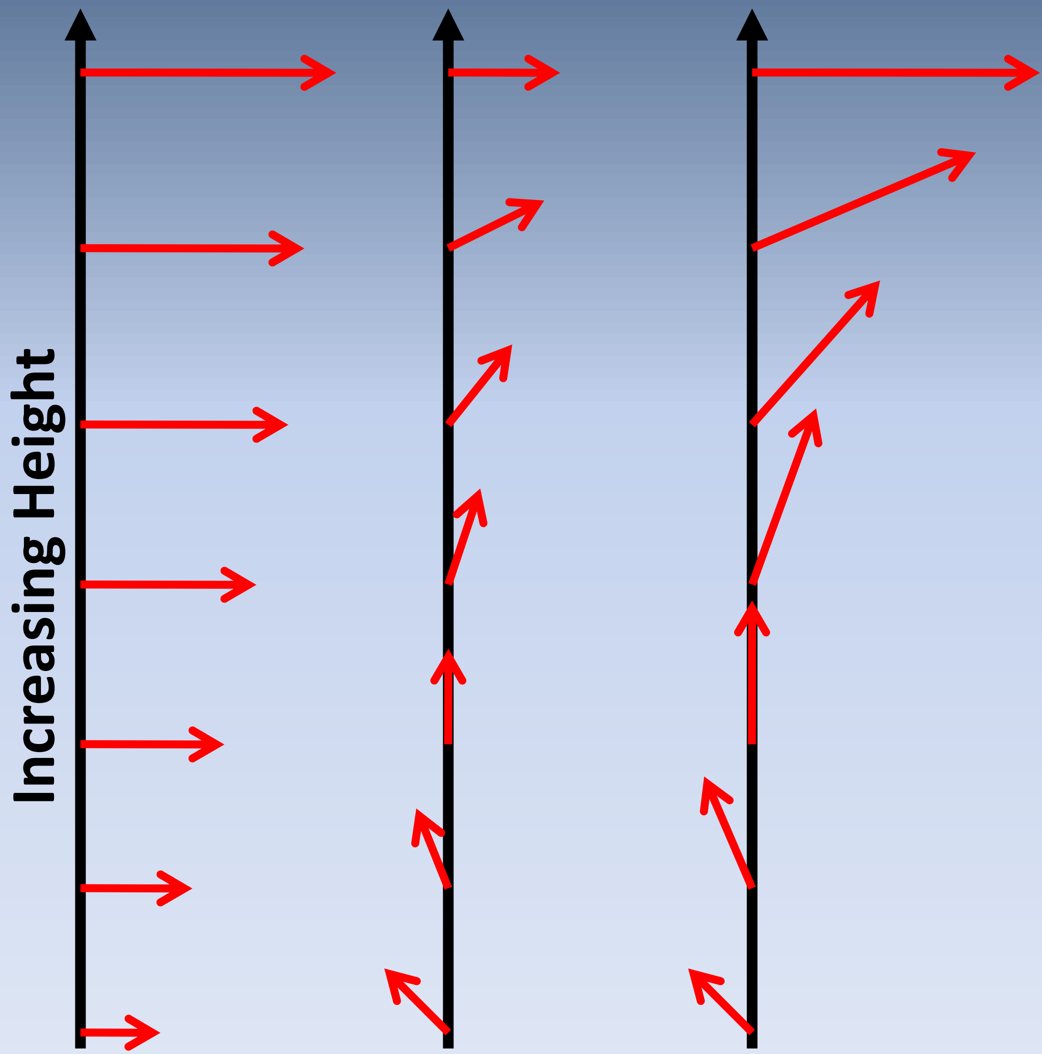



Skew-T Diagram
P (mb)
z (ft)
Lifted Index (LI) is simply the environmental temperature minus the air parcel temperature at 500 mb (in Celsius degrees).
In our example here, the environmental temperature is about -10 degrees and the lifted air parcel temperature is about 5 degrees.
LI = -10° - 5° = -15°
Lifted Air Parcel Temperature
500 mb
Environmental Temperature
Surface
100
200
300
400
500
600
700
800
900
1000
mb
−40
−30
−20
−10
0
10
20
30
40
T C
0.1 0.2 0.6 1.0 2.0 3.0 5.0 10.0 20.0 40.0 rs g/kg

The 3-Dimensional Atmosphere
Instability

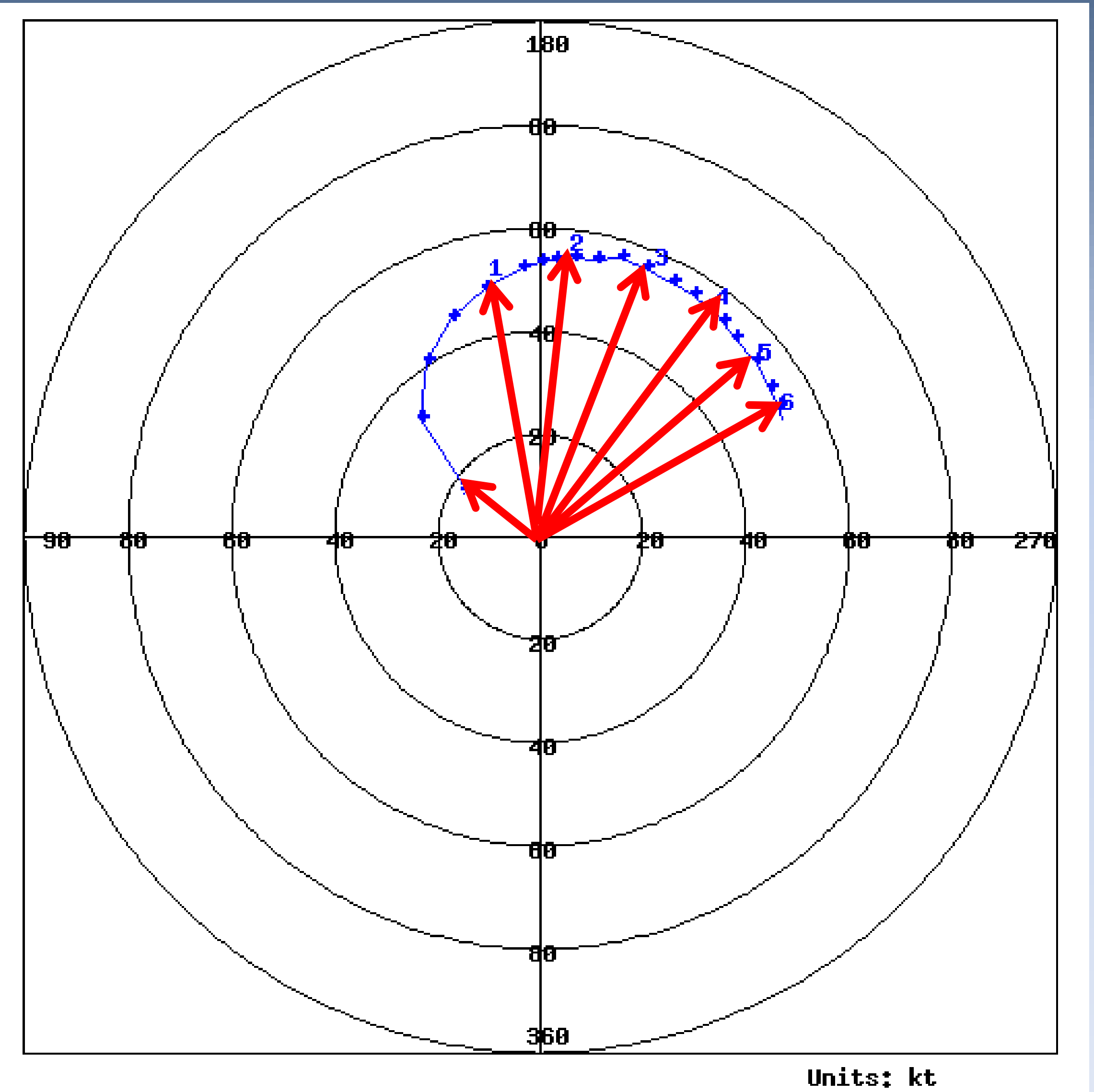


The 3-Dimensional Atmosphere
Wind Shear



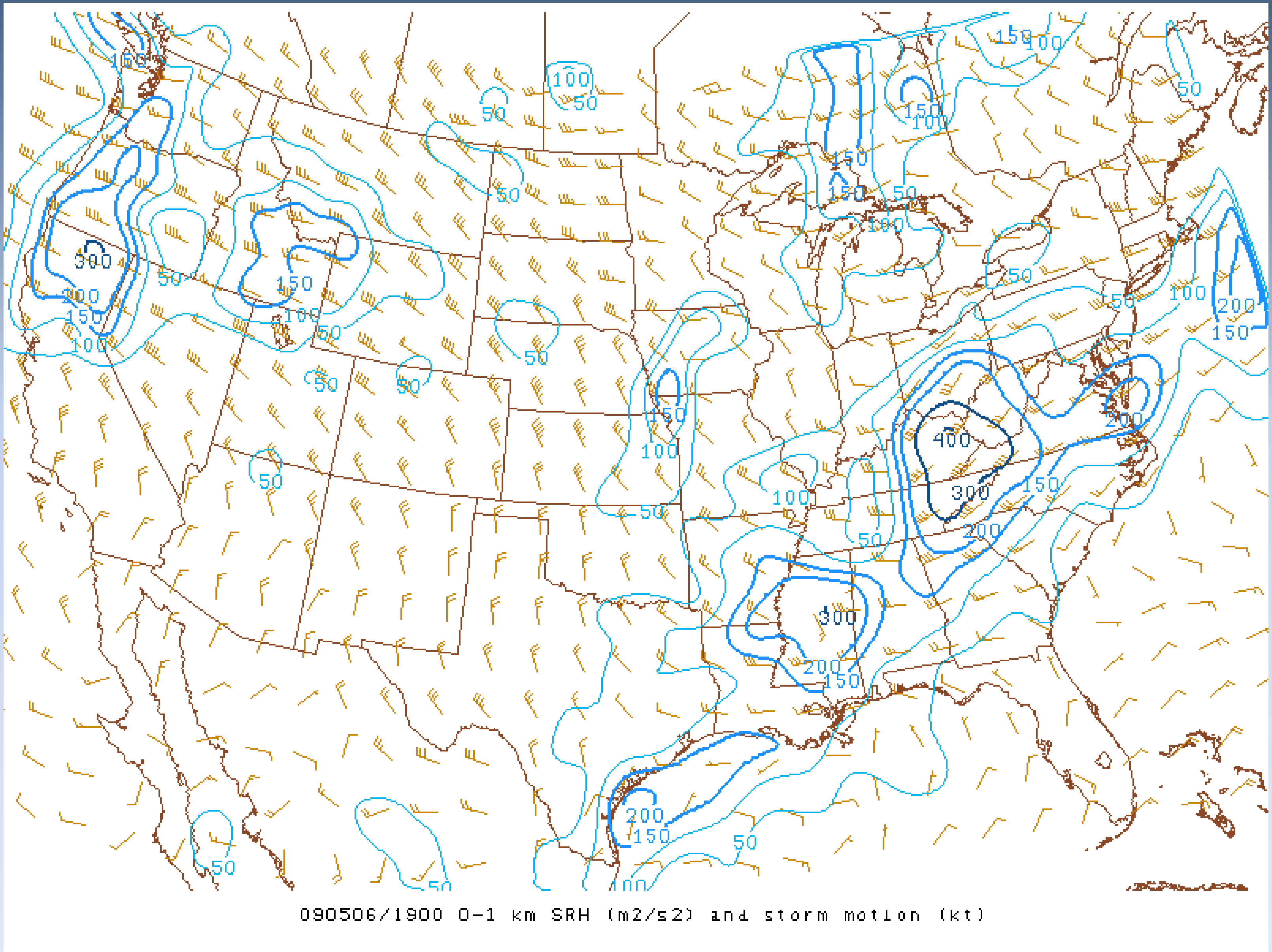
- Wind shear can be calculated in three ways
- Change in wind speed with height
- Change in wind direction with height
- Change in both speed and direction with height

The 3-Dimensional Atmosphere
Wind Shear

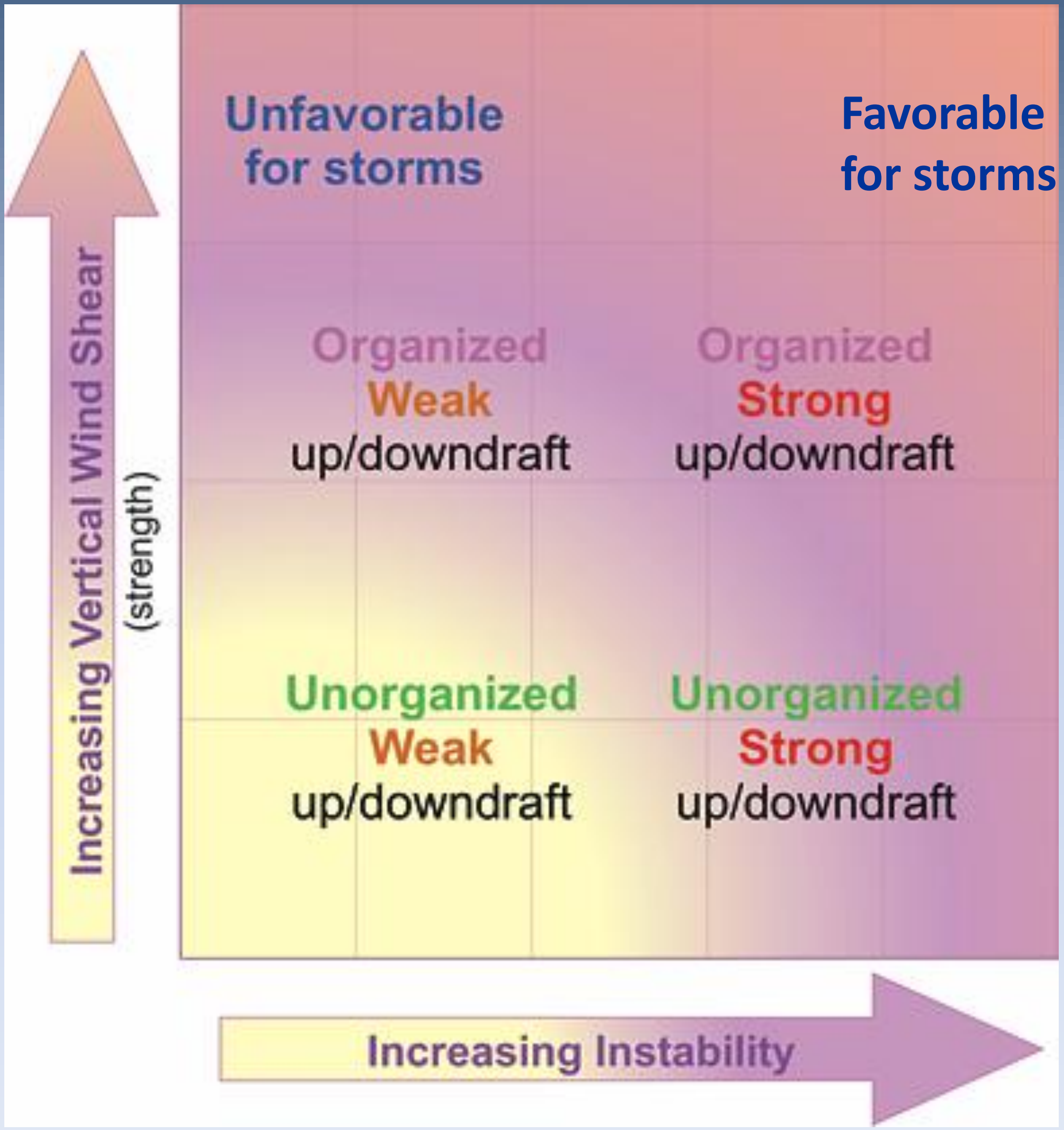


- Wind speed is typically calculated in terms of speed and direction change in the term Helicity or Storm Relative Helicity.
- Helicity is measured at several height levels, and that determines what type of storm is likely to form or what the mode of convection will be.
- 0 to 6 kilometers (storm motions)
- 0 to 3 km (supercells, multicell, or ordinary cell?)
- 0 to 1 km (tornadoes?)

The 3-Dimensional Atmosphere
Wind Shear

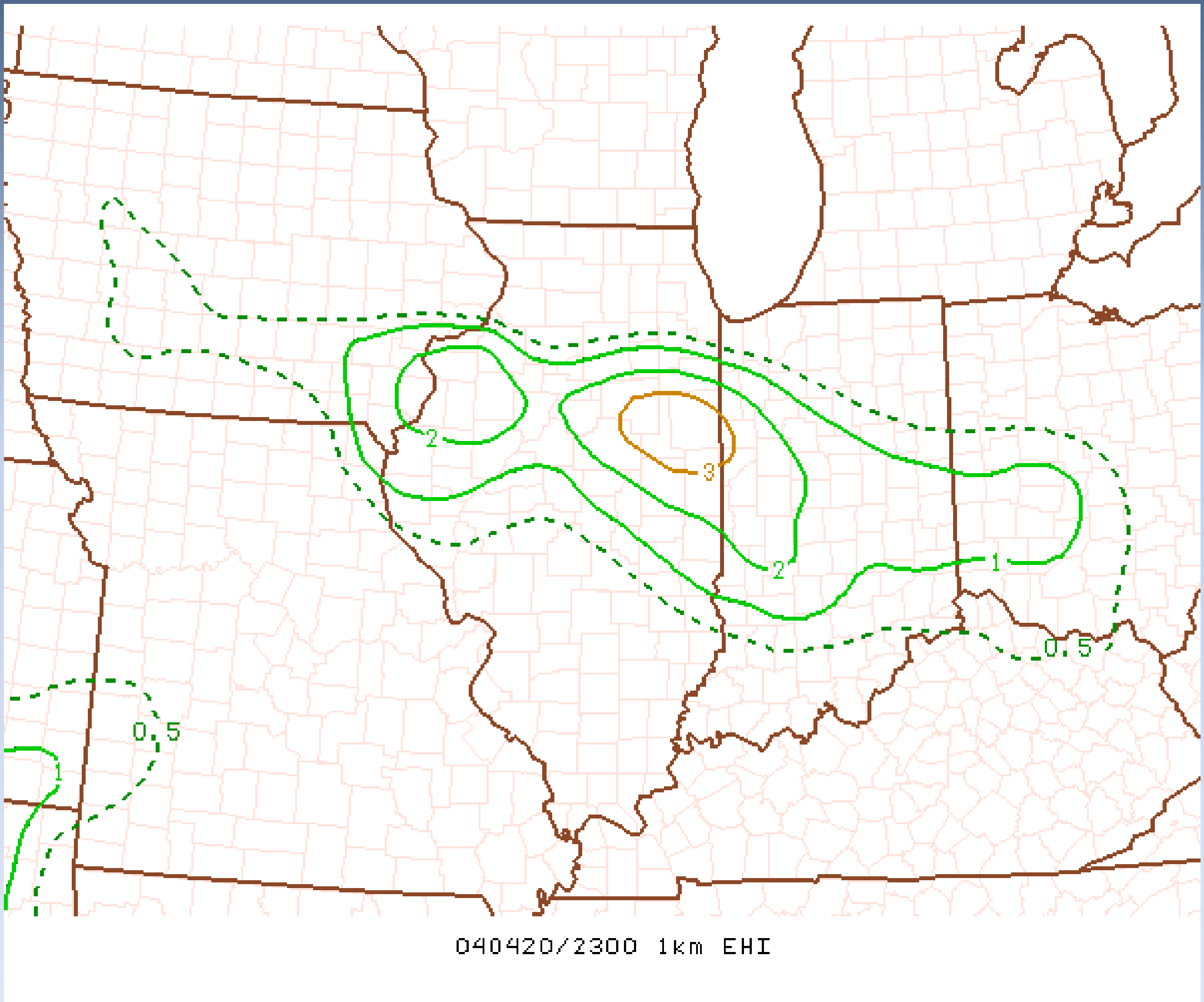


Finding the Perfect Balance Instability versus Wind Shear



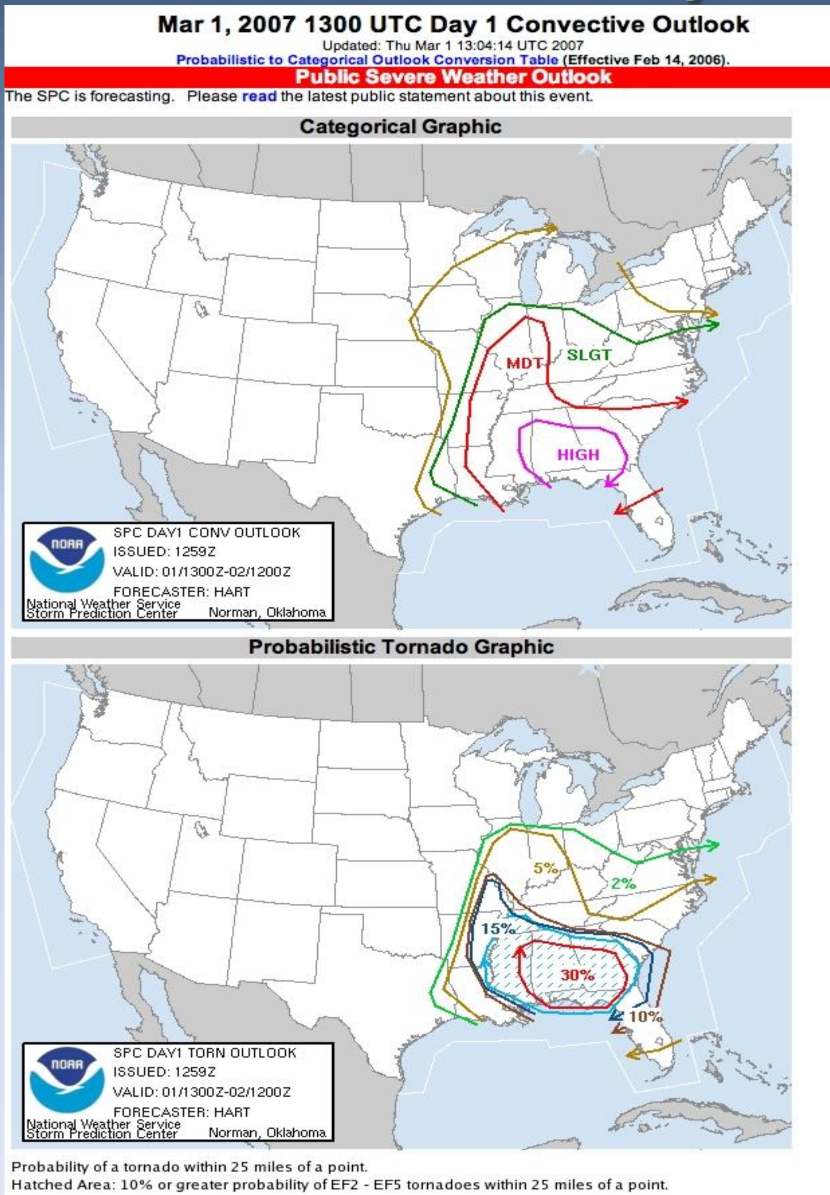
- Finding the perfect balance between instability and wind shear remains a forecast challenge.
- All about the favorable mode of convection.

Finding the Perfect Balance Instability versus Wind Shear



- Certain products like the Energy Helicity Index (EHI) can help you determine the mode of convection.
- EHI > 4 Watch Out!
- EHI 1 – 3 marginal
- EHI < 1 low

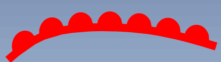
Finding the Perfect Balance
Instability versus Wind Shear

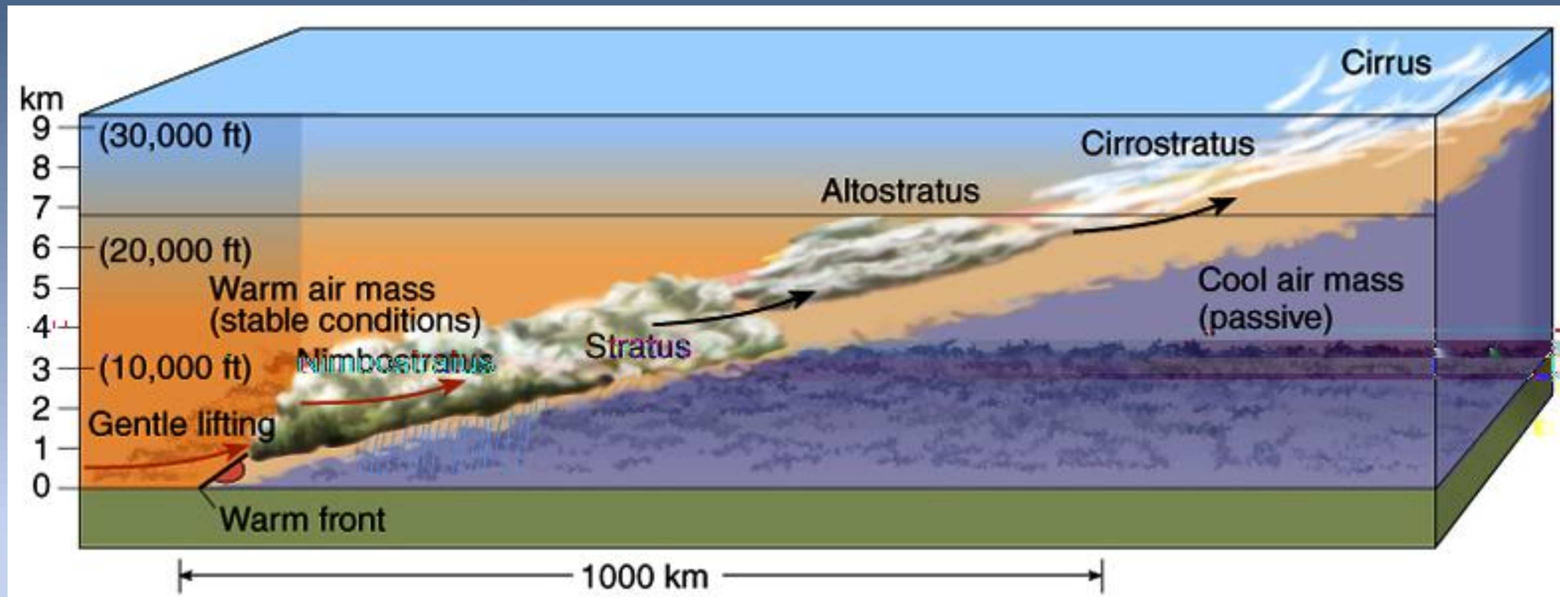


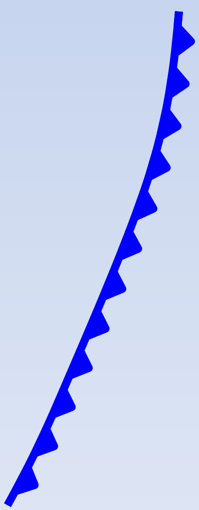
DAY 1 CONVECTIVE OUTLOOK NWS STORM PREDICTION CENTER NORMAN OK
0659 AM CST THU MAR 01 2007

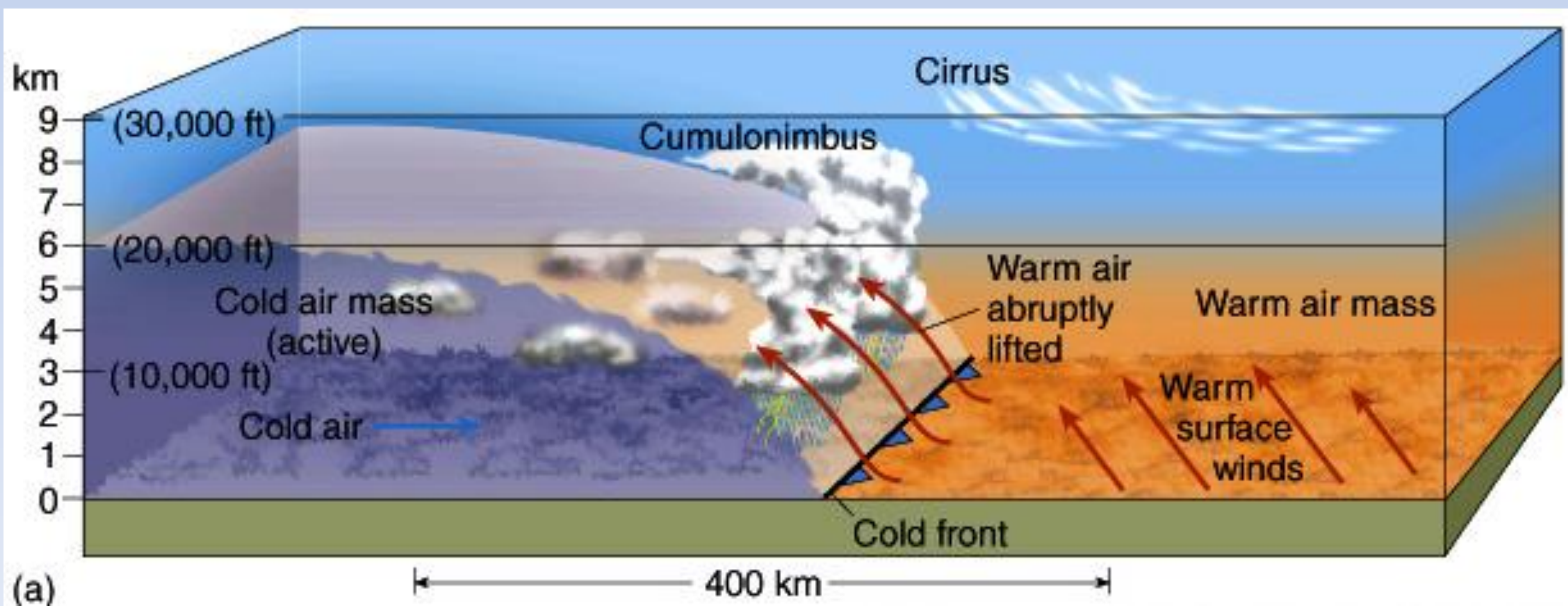
...GULF COAST REGION...
PRESENT INDICATIONS ARE THAT SCATTERED THUNDERSTORMS WILL DEVELOP OVER EASTERN LA AND MS BY MID MORNING...AHEAD OF UPPER TROUGH. THIS REGION WILL BE VERY MOIST AND UNSTABLE WITH MLCAPE VALUES OVER 1000 J/KG EXPECTED. VERY IMPRESSIVE VERTICAL SHEAR PROFILES ARE IN PLACE AND WILL ONLY STRENGTHEN THROUGH THE DAY. THIS WILL RESULT IN VERY FAVORABLE CONDITIONS FOR TORNADIC SUPERCELLS CAPABLE OF STRONG/ VIOLENT TORNADOES...LARGE HAIL...AND DAMAGING WINDS. THIS ACTIVITY WILL LIKELY SPREAD EASTWARD ACROSS PARTS OF AL/GA AND INTO NORTHERN FL THROUGH THE AFTERNOON AND EVENING. RAPID MOVEMENT OF UPPER TROUGH...STRENGTH OF WIND FIELDS...AND QUALITY OF RETURNING LOW LEVEL MOISTURE ALL POINT TO THE POTENTIAL FOR AN OUTBREAK OF TORNADOES TODAY.

The 3-Dimensional Atmosphere
Lifting Mechanism

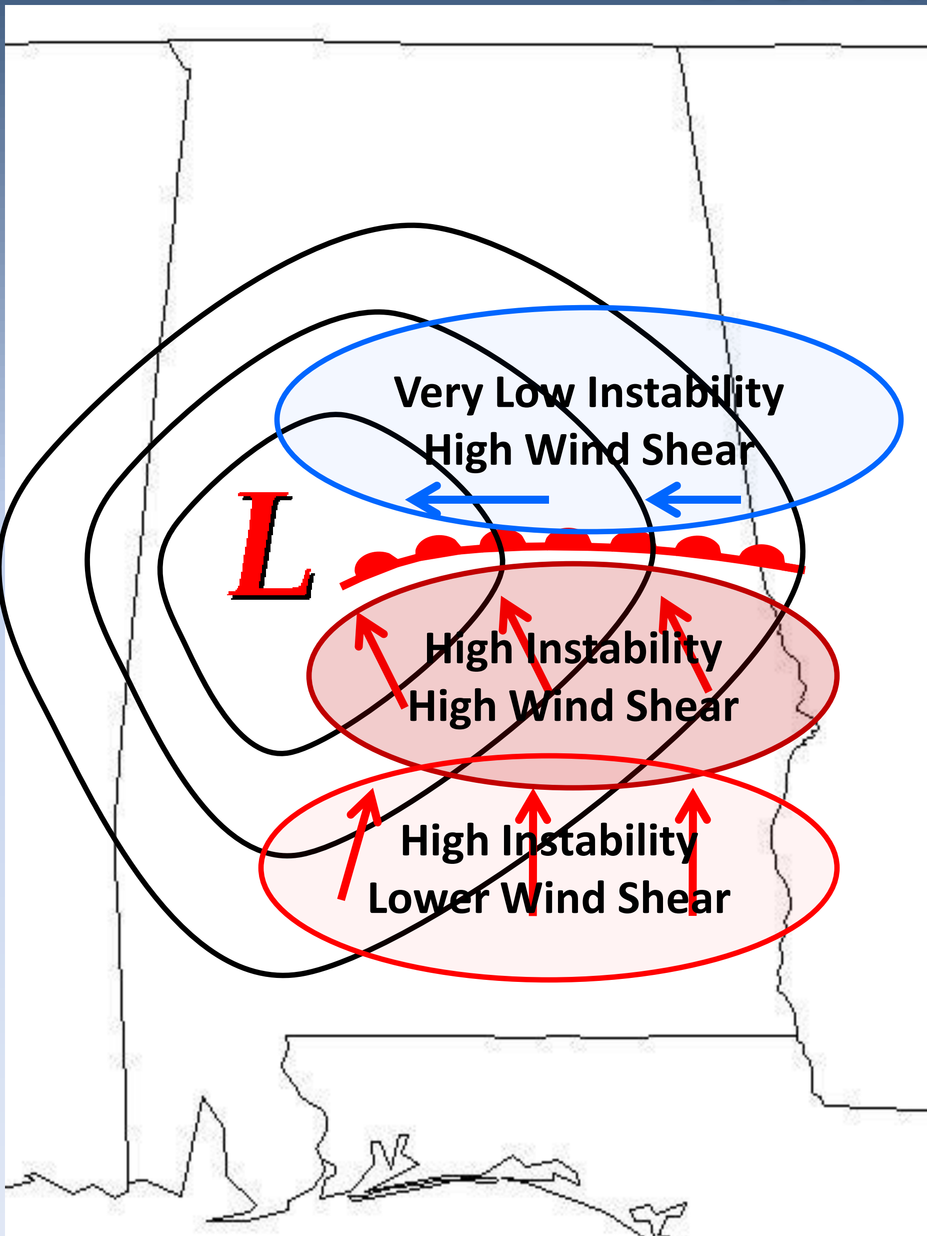






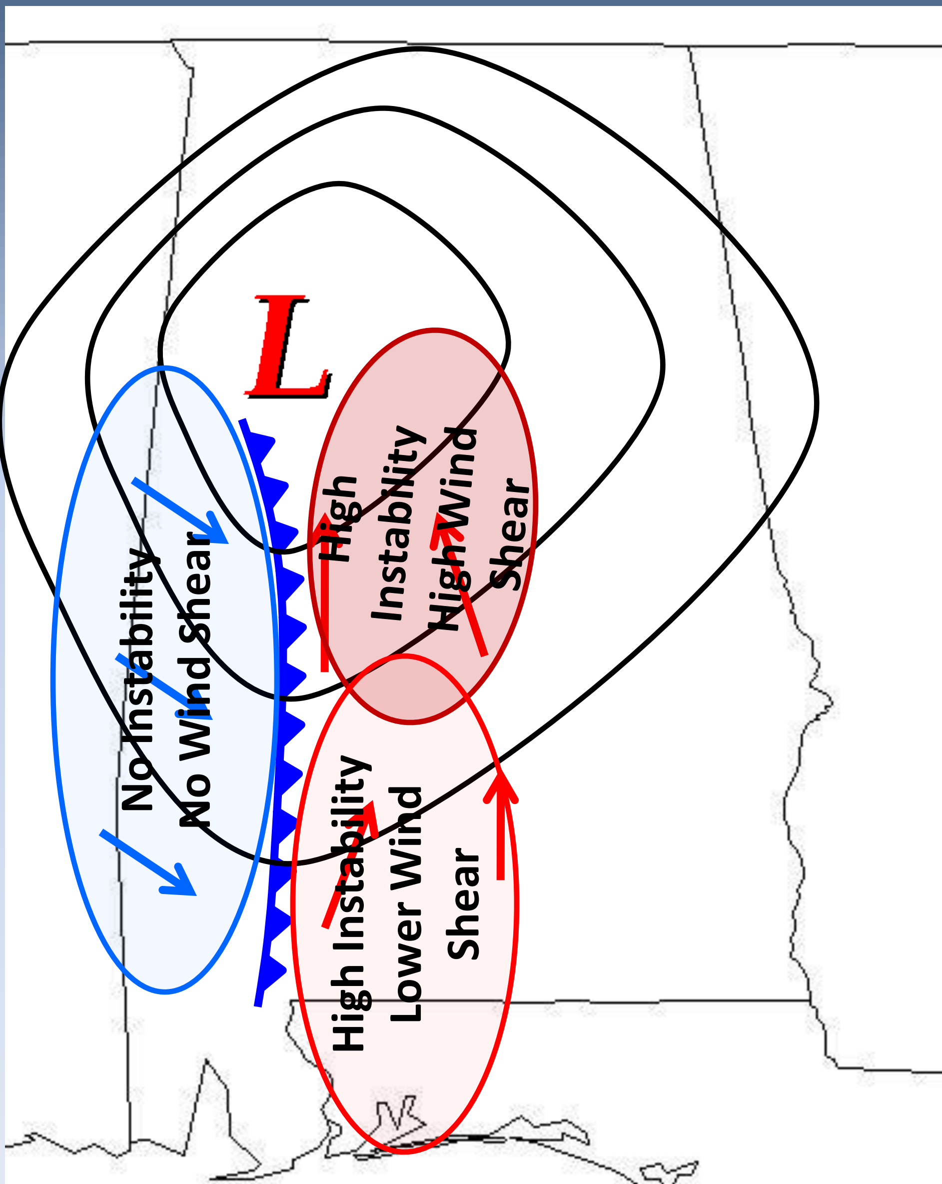


The 3-Dimensional Atmosphere
Warm Front

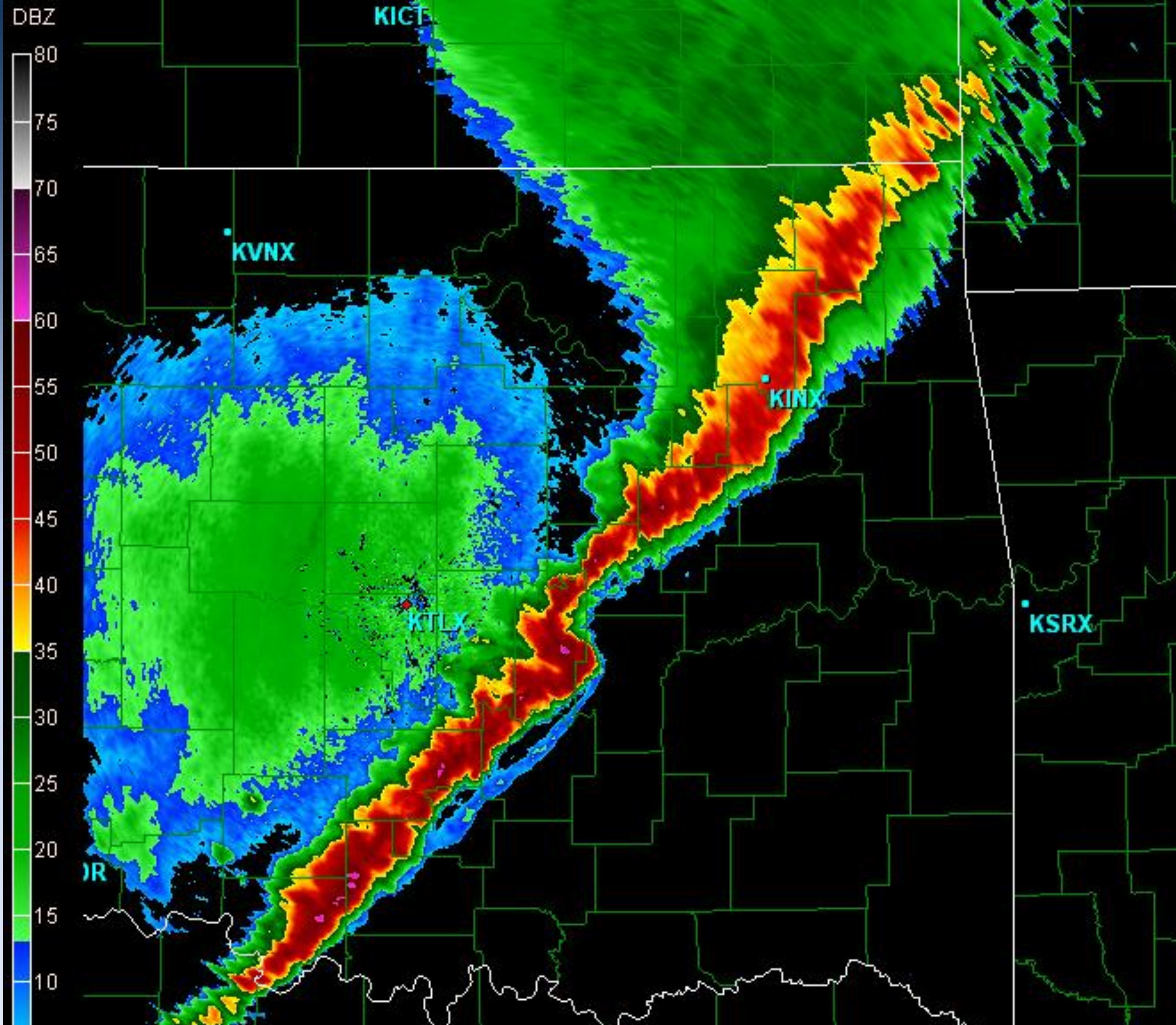


- Warm fronts are typically characterized by a distinct wind-shift from the south to the east as you go from south to north.
- South of the warm front the airmass is unstable with high wind shear.
- North of the warm front the wind shear can remain high, but the instability decreases significantly.

The 3-Dimensional Atmosphere
Cold Front

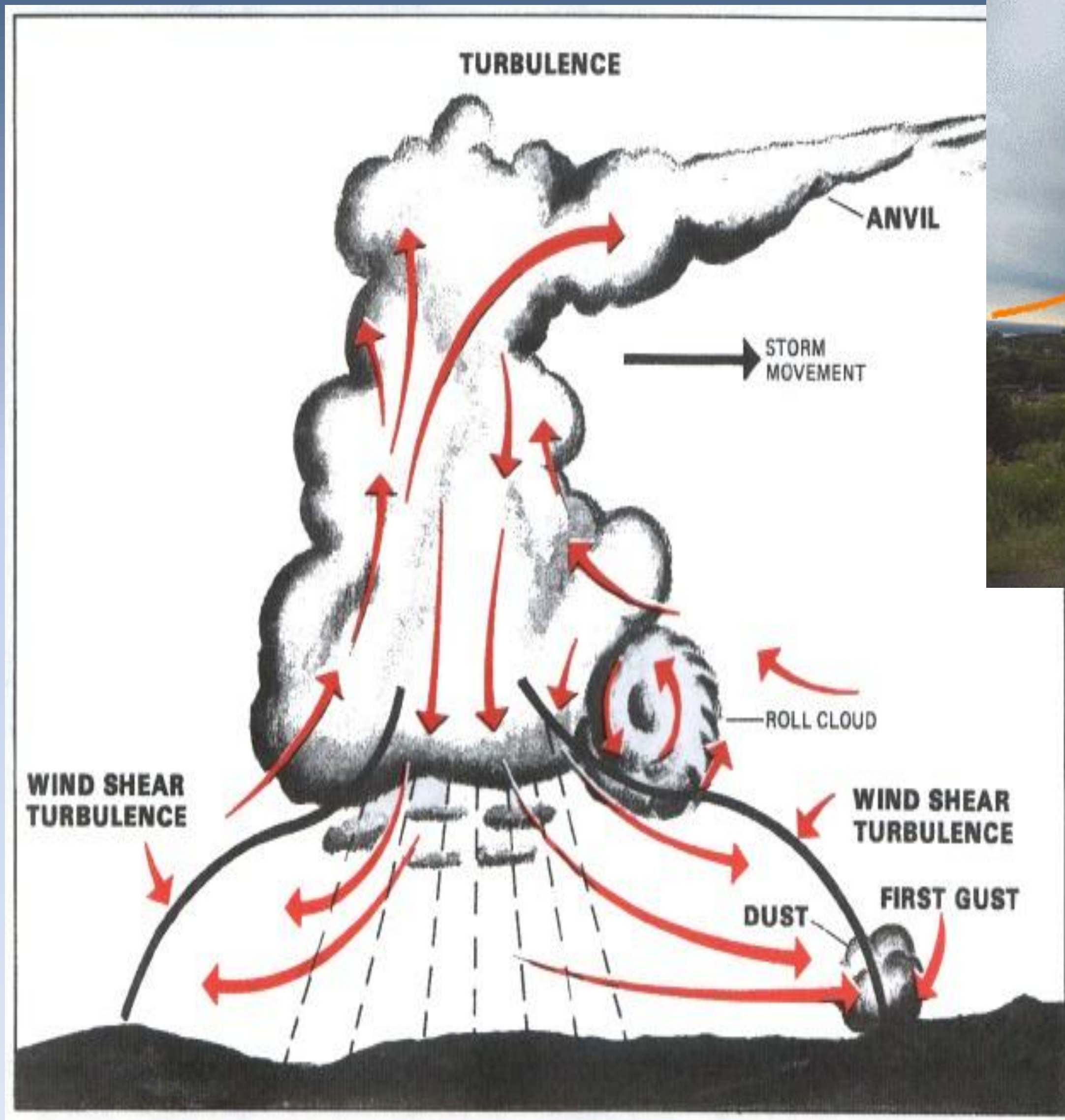


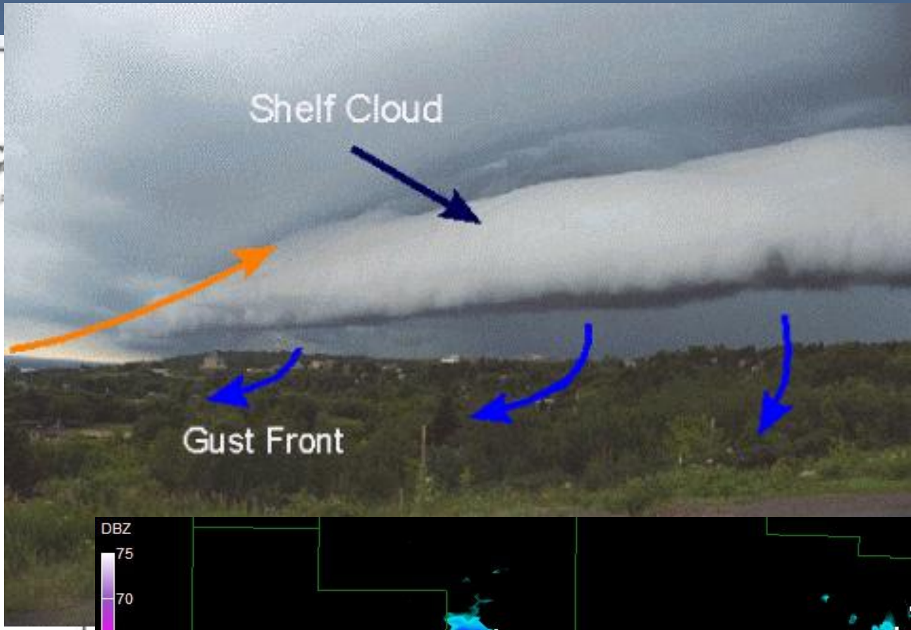
- Cold Fronts are characterized by an abrupt wind-shift from the south to the northwest as you go from west to east.
- Ahead of the cold front, generally there is unstable air with high wind shear.
- Behind the cold front the air is colder, drier and virtually no instability or wind shear.

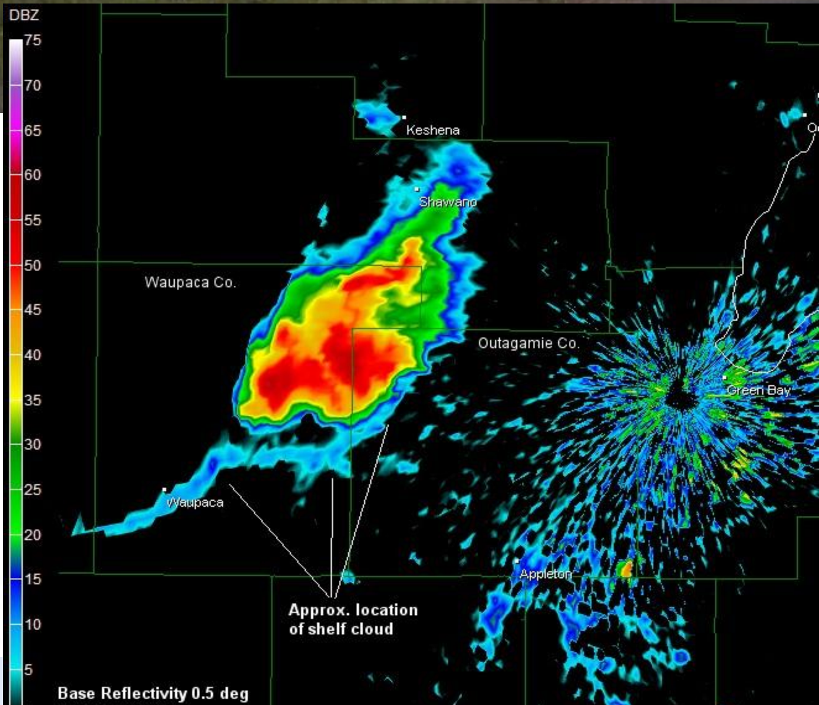

DBZ
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
KICT
KVNX
KINX
KTLX
KSRX


Tornado Watch # 947 - Valid from 805 PM until 300 AM CST

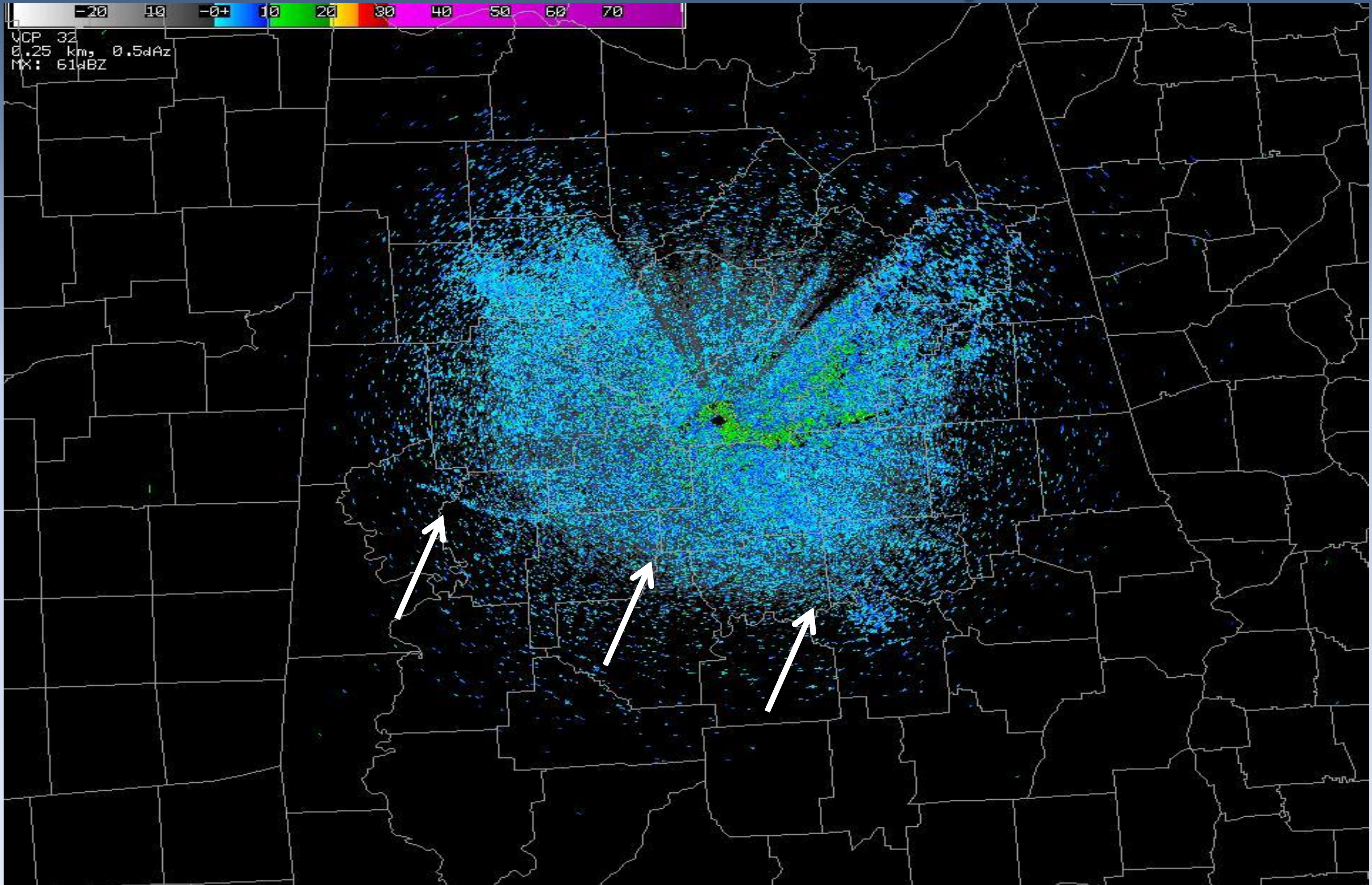
The 3-Dimensional Atmosphere
Gust Front



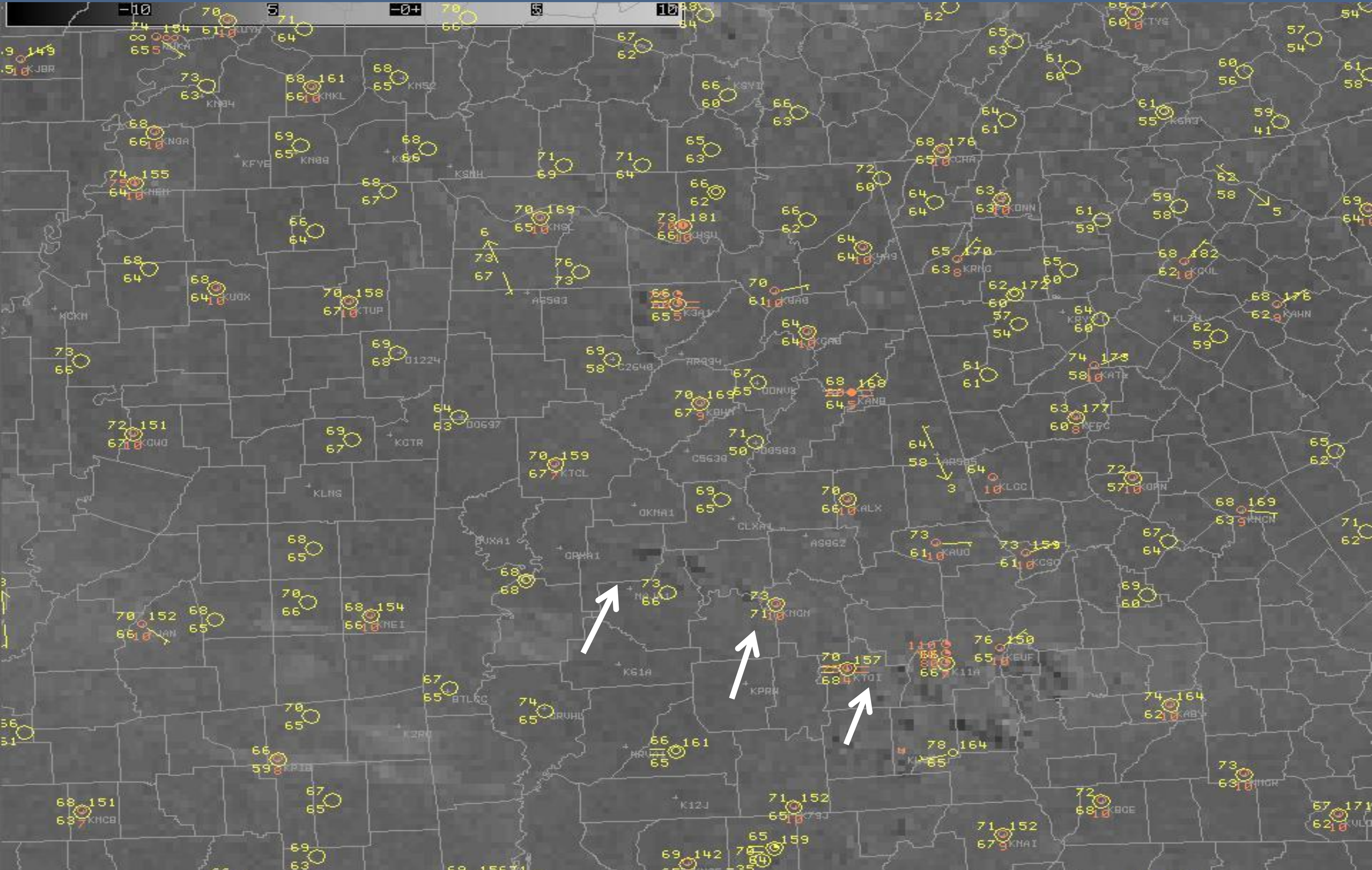




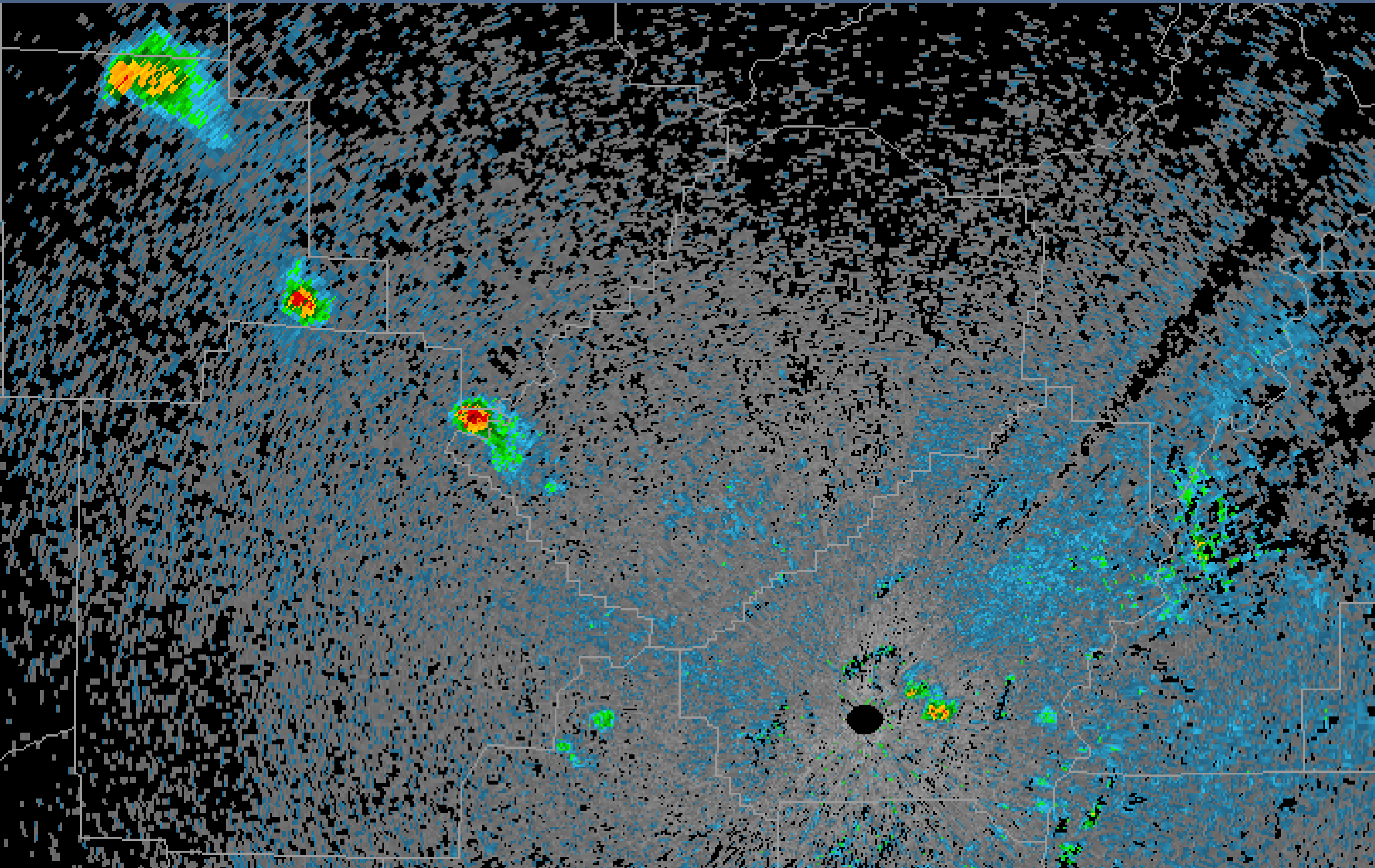
The 3-Dimensional Atmosphere
Mesoscale Boundary



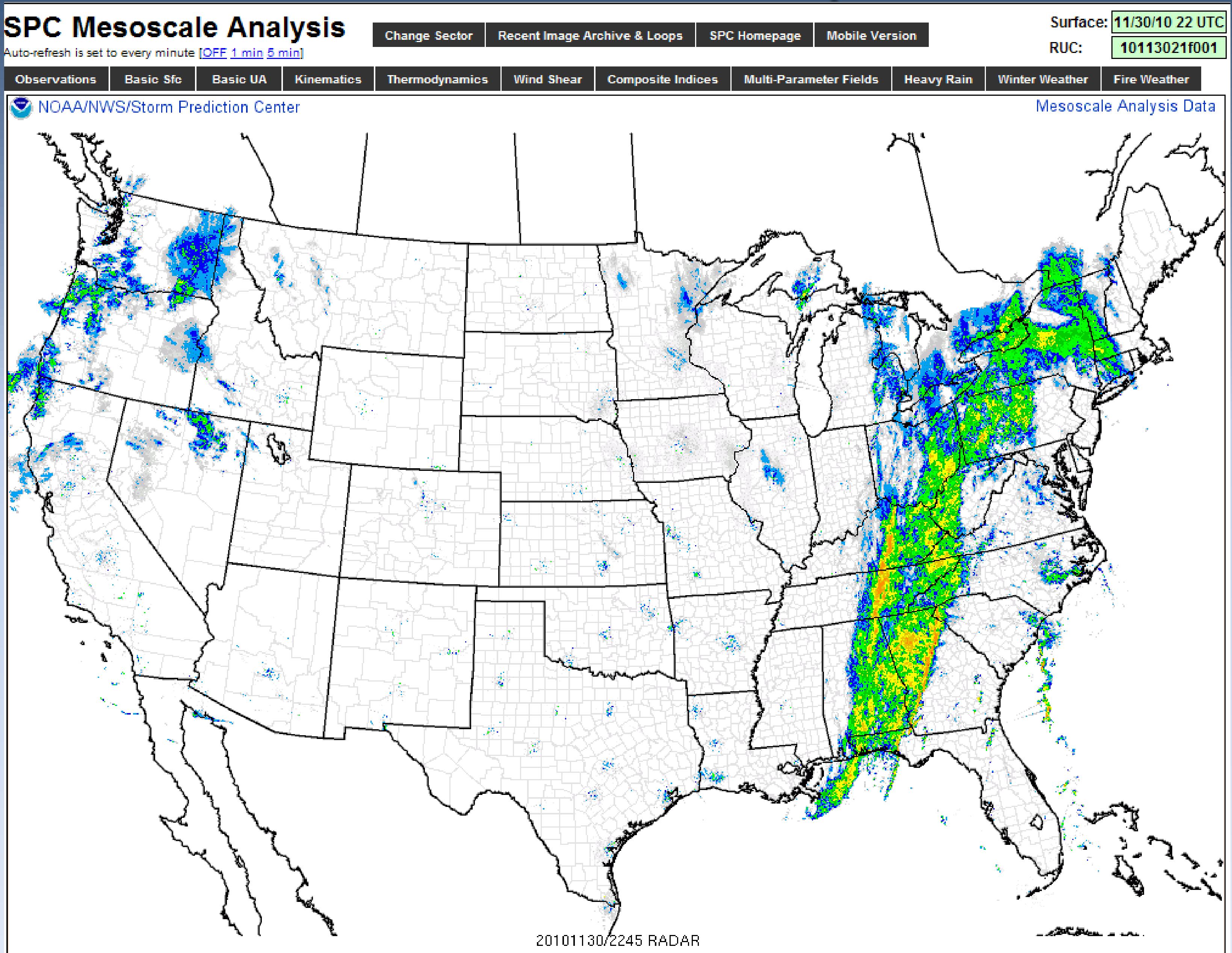
The 3-Dimensional Atmosphere
Mesoscale Boundary



The 3-Dimensional Atmosphere
Mesoscale Boundary



Instability, Wind Shear, and Lifting Mechanisms
Where Can I Get Help?



SPC Mesoscale Analysis

Auto-refresh is set to every minute [OFF 1 min 5 min]

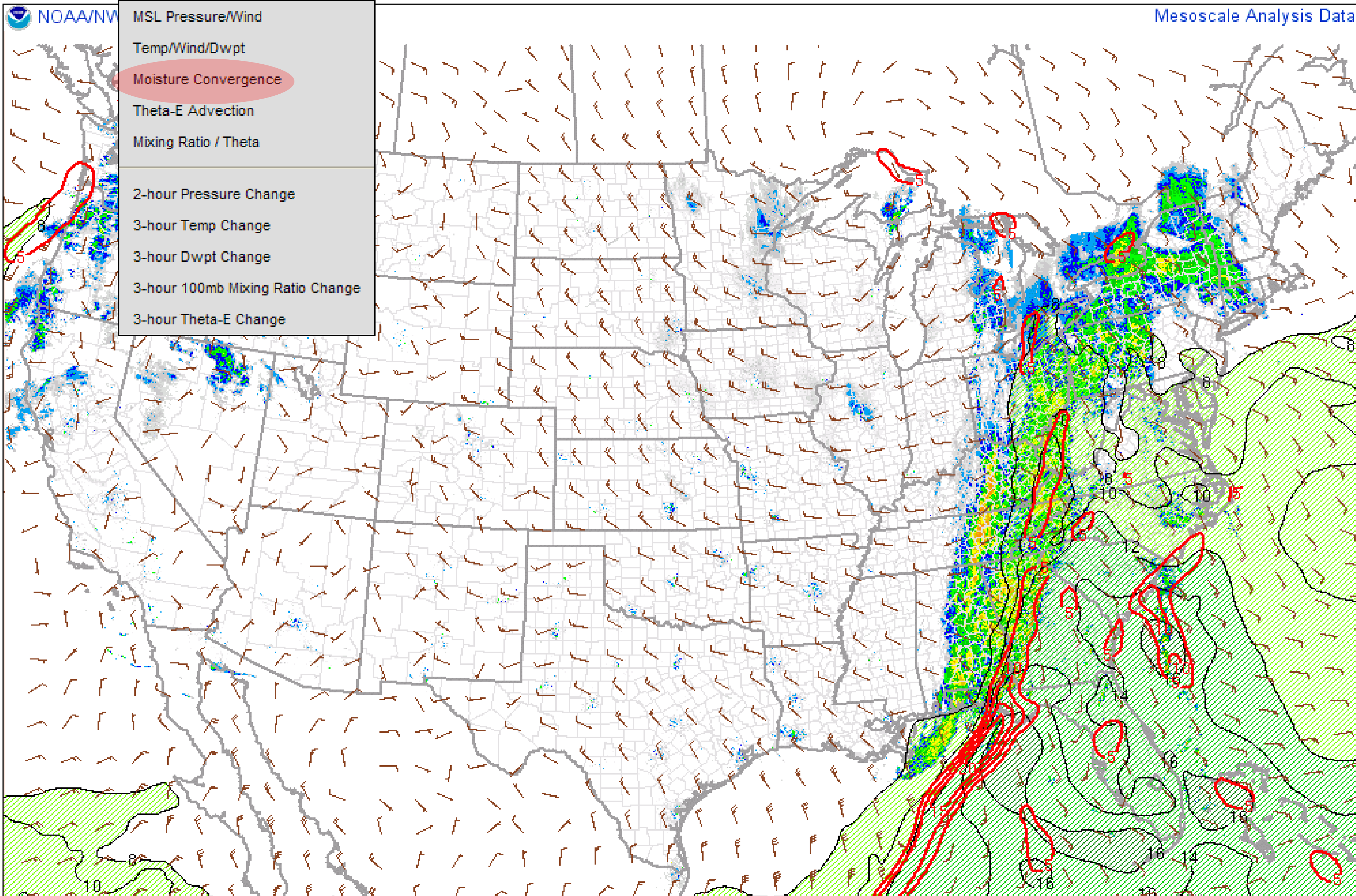
Change Sector | Recent Image Archive & Loops | SPC Homepage | Mobile Version

Surface: 11/30/10 22 UTC

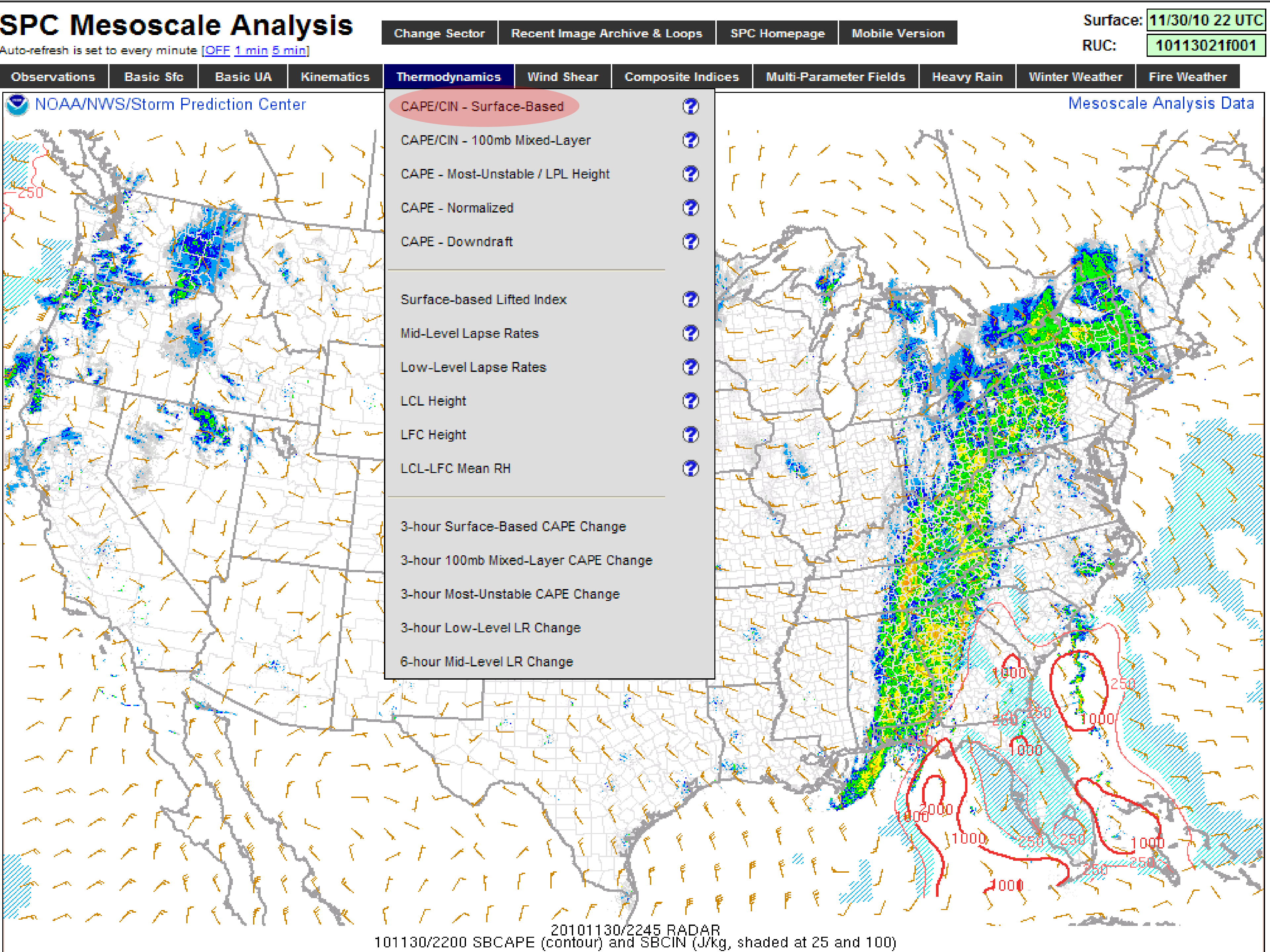
RUC: 10113021f001

Observations | Basic Sfc | Basic UA | Kinematics | Thermodynamics | Wind Shear | Composite Indices | Multi-Parameter Fields | Heavy Rain | Winter Weather | Fire Weather

- MSL Pressure/Wind
- Temp/Wind/Dwpt
- Moisture Convergence
- Theta-E Advection
- Mixing Ratio / Theta
- 2-hour Pressure Change
- 3-hour Temp Change
- 3-hour Dwpt Change
- 3-hour 100mb Mixing Ratio Change
- 3-hour Theta-E Change



20101130/2245 RADAR
101130/2200 Surface Mstr Conv and Mixing Ratio (fill)


SPC Mesoscale Analysis
Auto-refresh is set to every minute [OFF 1 min 5 min]
Change Sector
Recent Image Archive & Loops
SPC Homepage
Mobile Version
Surface: 11/30/10 22 UTC
RUC: 10113021f001
Observations
Basic Sfc
Basic UA
Kinematics
Thermodynamics
Wind Shear
Composite Indices
Multi-Parameter Fields
Heavy Rain
Winter Weather
Fire Weather
NOAA/NWS/Storm Prediction Center
Mesoscale Analysis Data
CAPE/CIN - Surface-Based
CAPE/CIN - 100mb Mixed-Layer
CAPE - Most-Unstable / LPL Height
CAPE - Normalized
CAPE - Downdraft
Surface-based Lifted Index
Mid-Level Lapse Rates
Low-Level Lapse Rates
LCL Height
LFC Height
LCL-LFC Mean RH
3-hour Surface-Based CAPE Change
3-hour 100mb Mixed-Layer CAPE Change
3-hour Most-Unstable CAPE Change
3-hour Low-Level LR Change
6-hour Mid-Level LR Change
20101130/2245 RADAR
101130/2200 SBCAPE (contour) and SBCIN (J/kg, shaded at 25 and 100)

SPC Mesoscale Analysis

Auto-refresh is set to every minute [OFF 1 min 5 min]

Change Sector | Recent Image Archive & Loops | SPC Homepage | Mobile Version

Surface: 11/30/10 22 UTC

RUC: 10113021f001

Observations | Basic Sfc | Basic UA | Kinematics | Thermodynamics | Wind Shear | Composite Indices | Multi-Parameter Fields | Heavy Rain | Winter Weather | Fire Weather

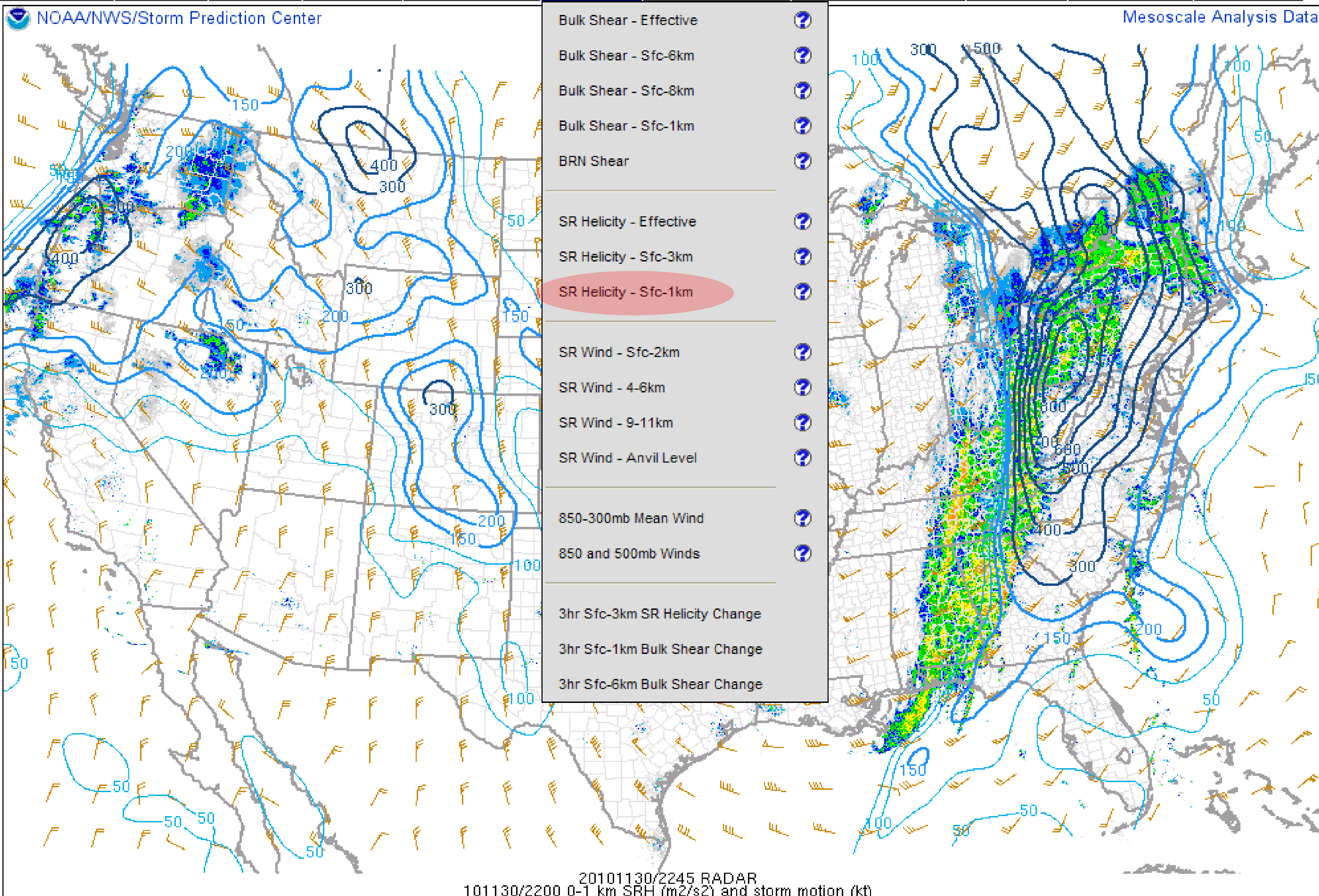
- Bulk Shear - Effective
- Bulk Shear - Sfc-6km
- Bulk Shear - Sfc-8km
- Bulk Shear - Sfc-1km
- BRN Shear

- SR Helicity - Effective
- SR Helicity - Sfc-3km
- SR Helicity - Sfc-1km

- SR Wind - Sfc-2km
- SR Wind - 4-6km
- SR Wind - 9-11km
- SR Wind - Anvil Level

- 850-300mb Mean Wind
- 850 and 500mb Winds

- 3hr Sfc-3km SR Helicity Change
- 3hr Sfc-1km Bulk Shear Change
- 3hr Sfc-6km Bulk Shear Change



University of Wyoming
College of Engineering

Department of Atmospheric Science

Wyoming | Cities | Surface | Upper Air | Observations | F
Maps | Sou

Region	Type of plot	Year	Month	From	To
North America	Text: List	2009	Nov	29/12Z	29/12Z

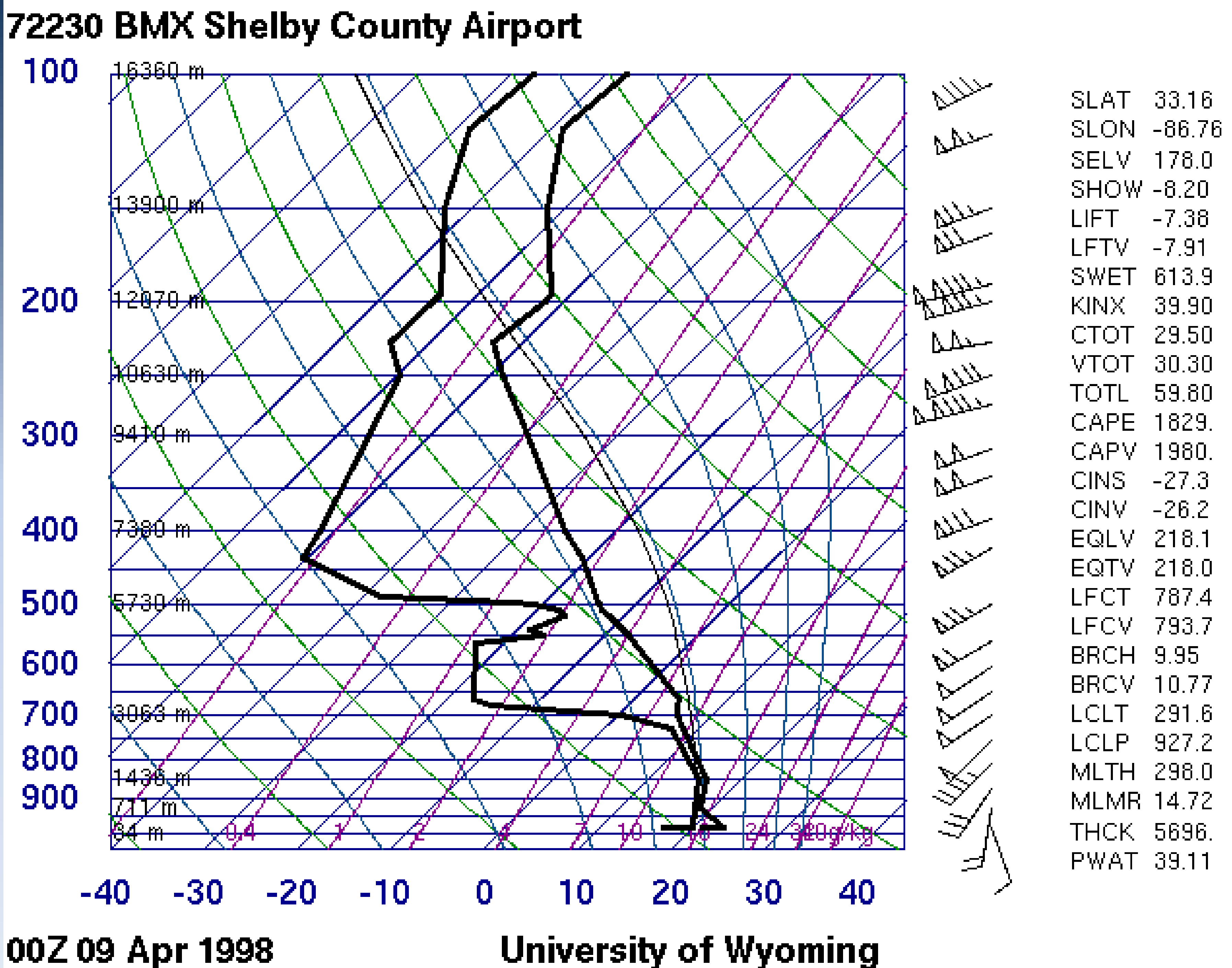
Click on the image to request a sounding at that location or enter the station number below.

Station Number: 72249

☐ Recalculate Data

72249 Ft Worth, TX (FWD)

Internet



72230 BMX Shelby County Airport
100
200
300
400
500
600
700
800
900
16360 m
13900 m
12070 m
10630 m
9410 m
7380 m
5730 m
3063 m
1436 m
711 m
84 m
0.4
1
2
4
7
10
16
24
32
40g/kg
-40
-30
-20
-10
0
10
20
30
40
SLAT 33.16
SLON -86.76
SELV 178.0
SHOW -8.20
LIFT -7.38
LFTV -7.91
SWET 613.9
KINX 39.90
CTOT 29.50
VTOT 30.30
TOTL 59.80
CAPE 1829.
CAPV 1980.
CINS -27.3
CINV -26.2
EQLV 218.1
EQTV 218.0
LFCT 787.4
LFCV 793.7
BRCH 9.95
BRCV 10.77
LCLT 291.6
LCLP 927.2
MLTH 298.0
MLMR 14.72
THCK 5696.
PWAT 39.11
00Z 09 Apr 1998
University of Wyoming

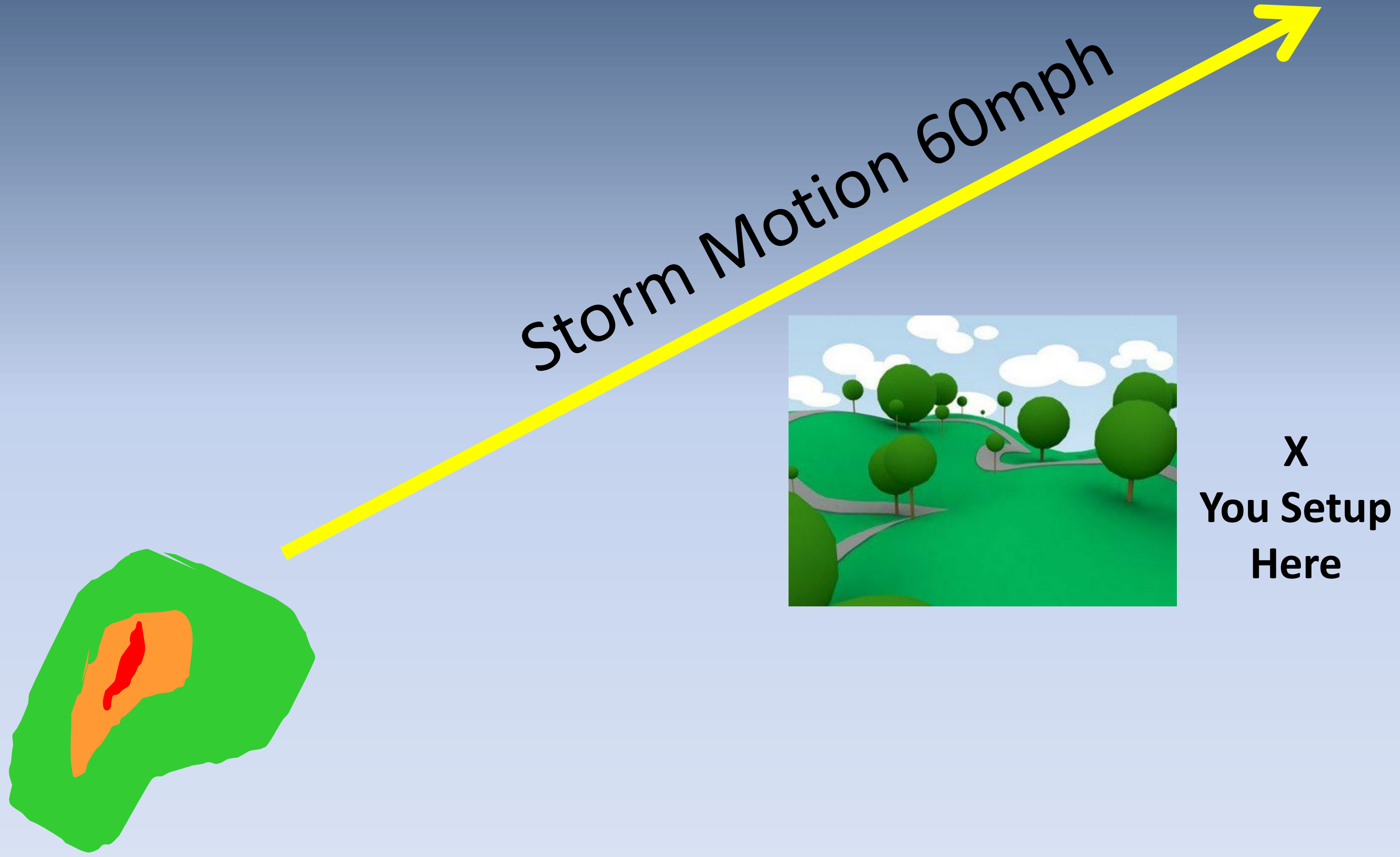
Instability, Wind Shear, and Lifting Mechanisms
Where Can I Get Help?

http://www.spc.noaa.gov/exper/mesoanalysis

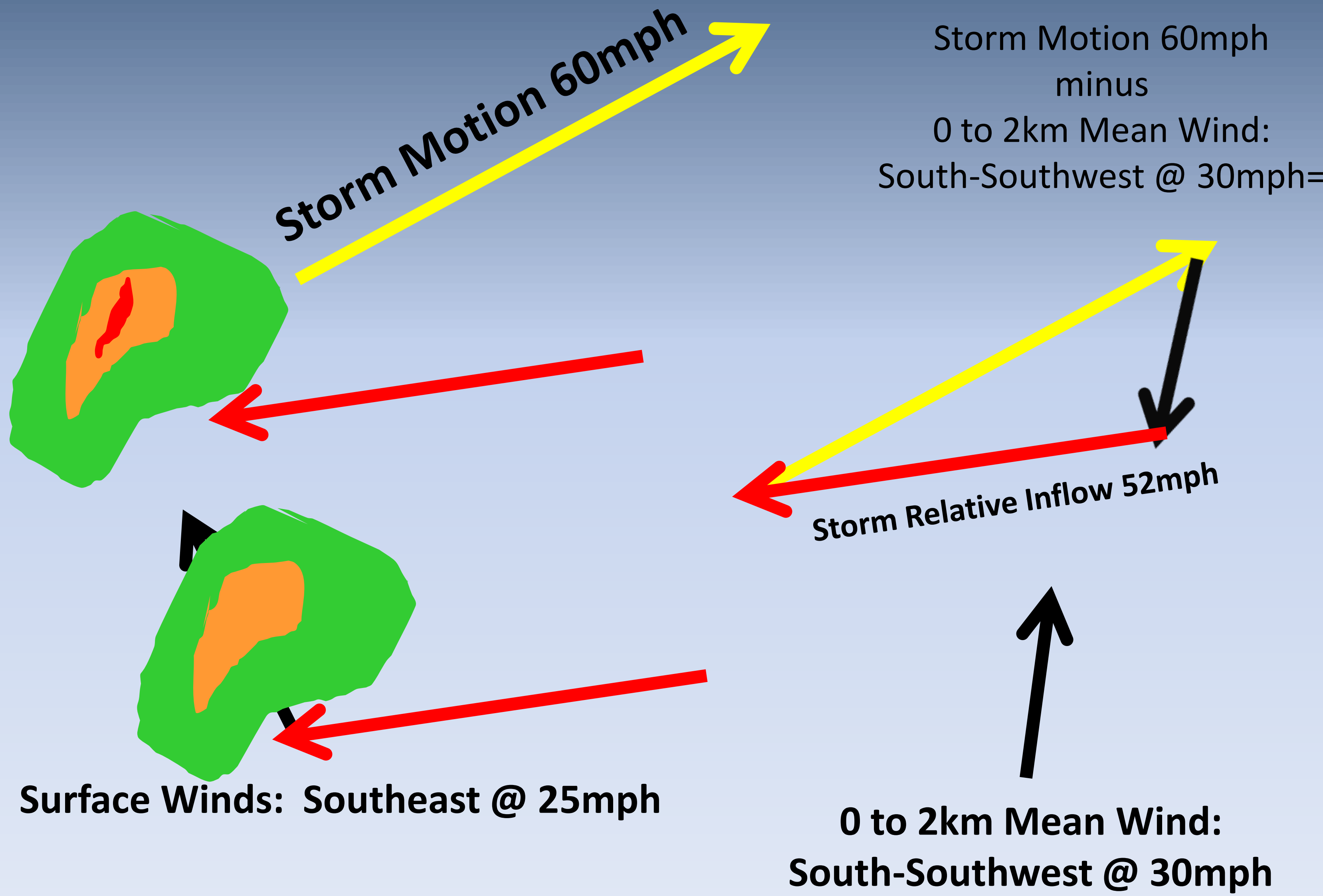
http://weather.uwyo.edu/upperair/sounding.html

What We Observe When Spotting Midwest versus The Southeast

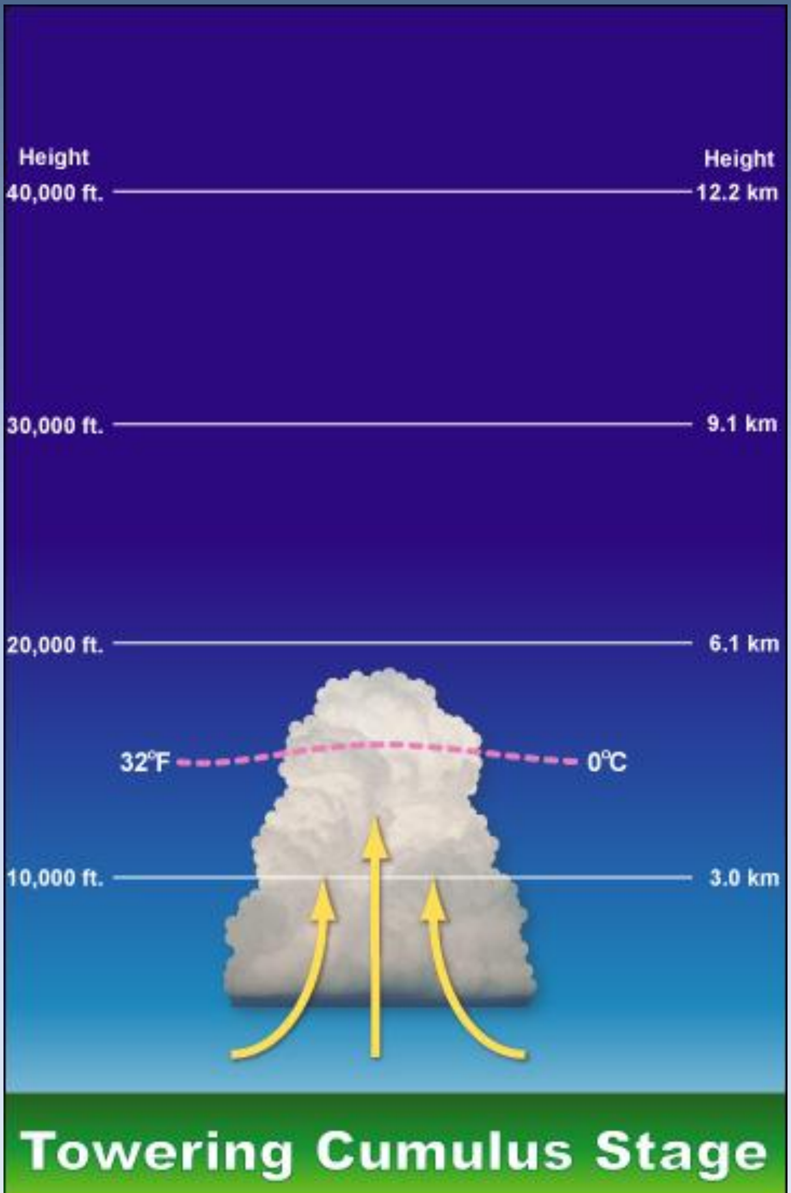
What We Observe When Spotting Storm Motion



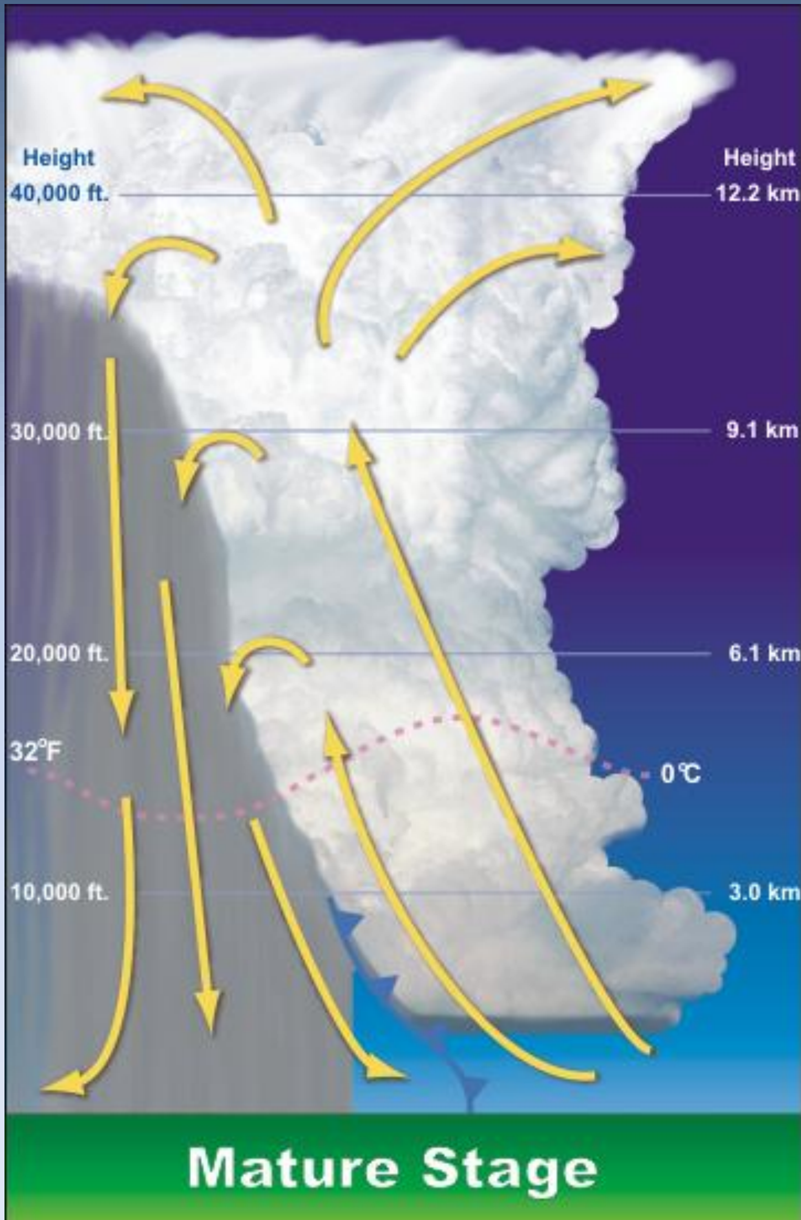
What We Observe When Spotting Storm Relative Inflow



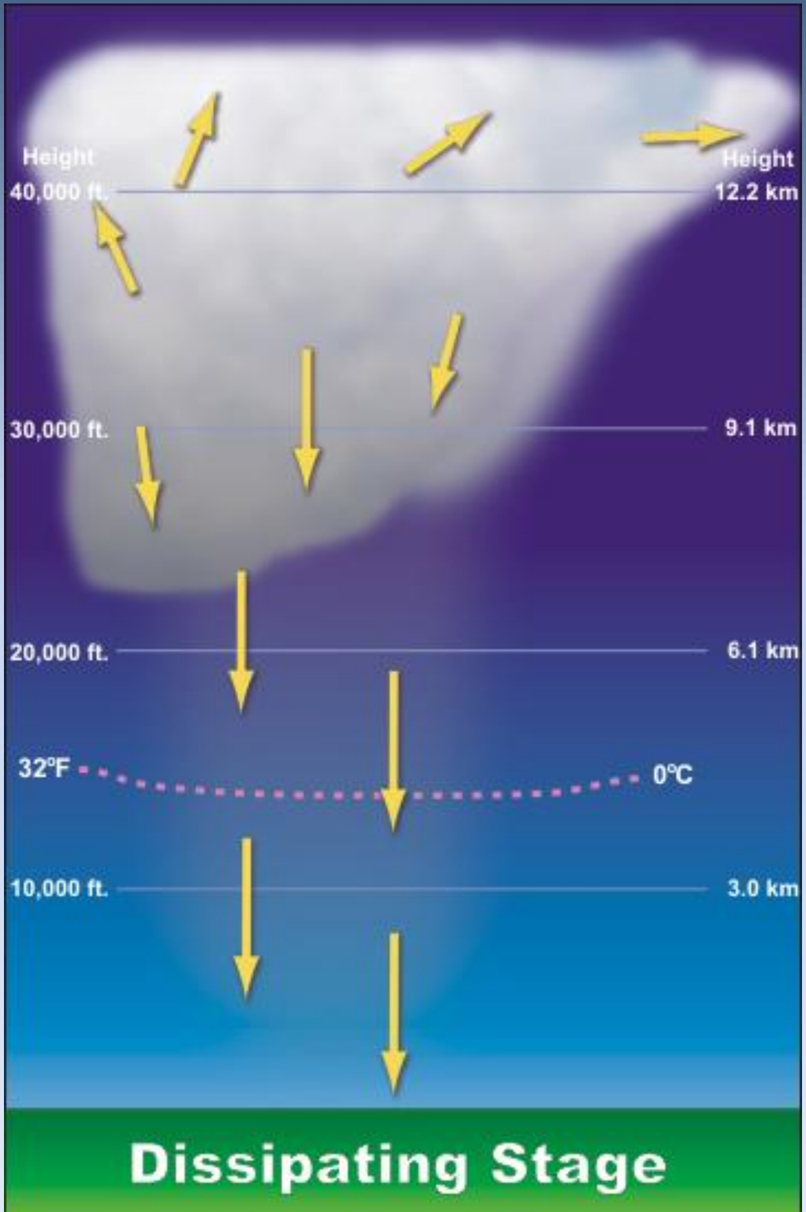
What We Observe When Spotting Towering Cumulus



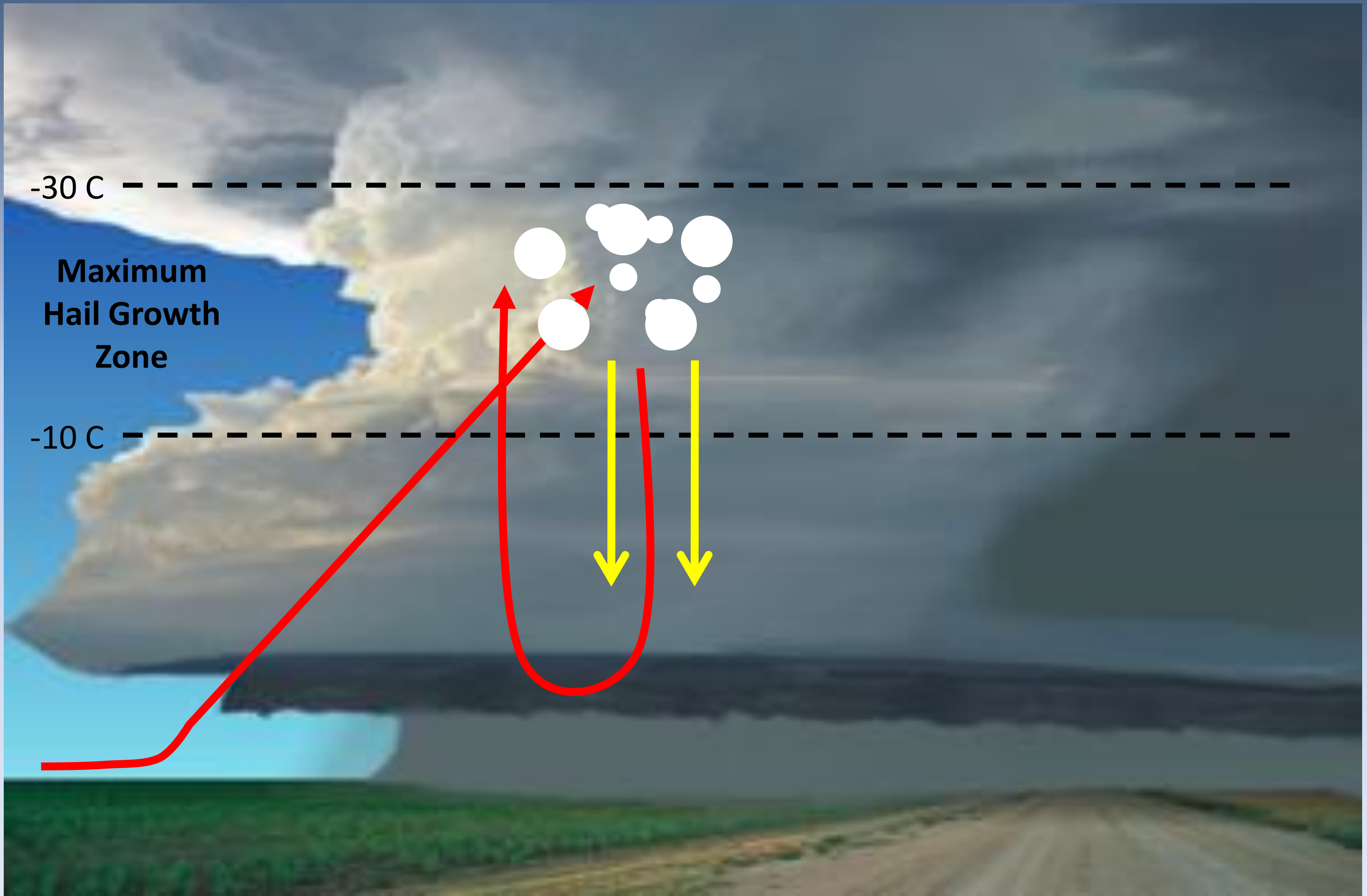
What We Observe When Spotting Mature Stage



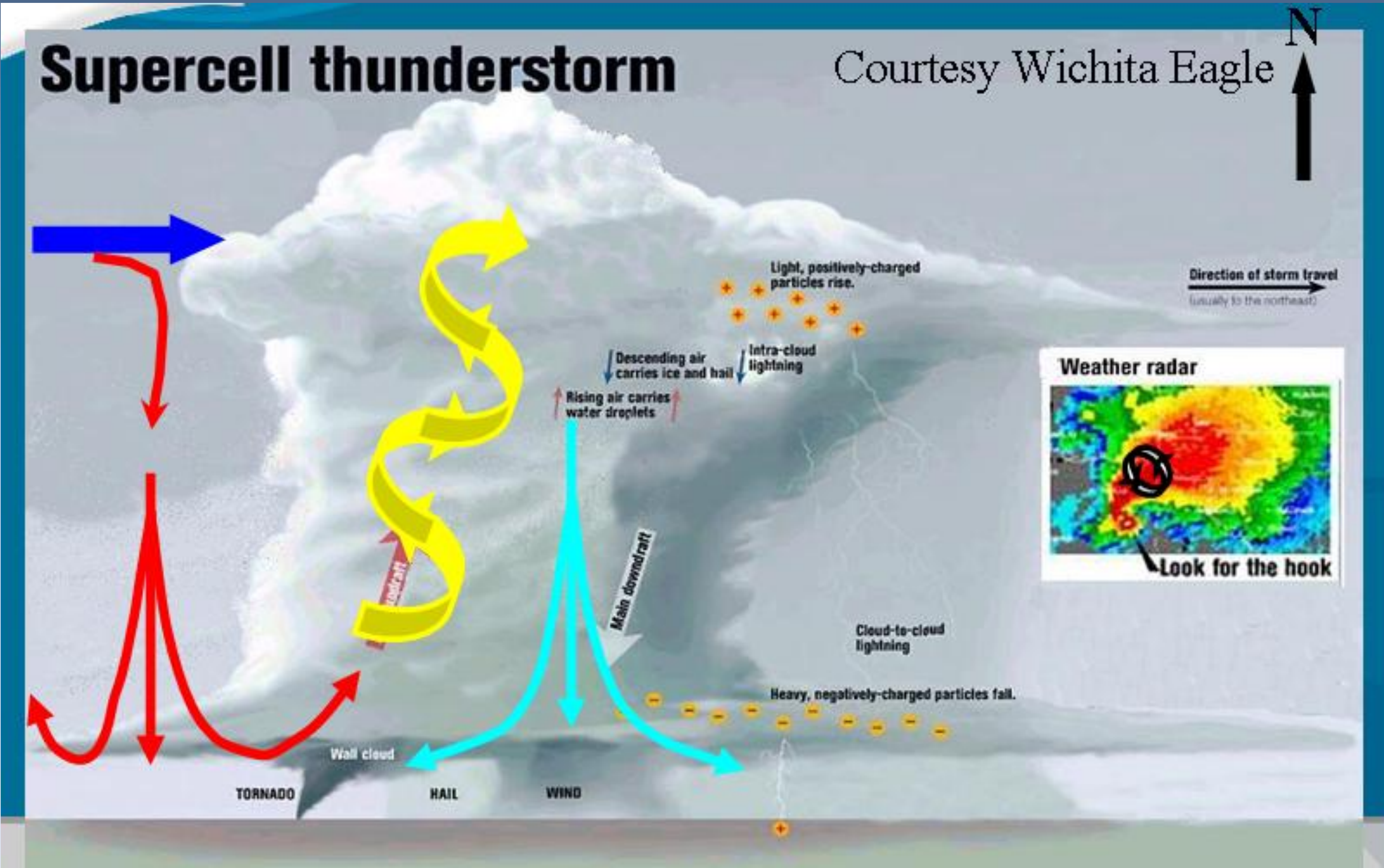
What We Observe When Spotting Dissipation Stage



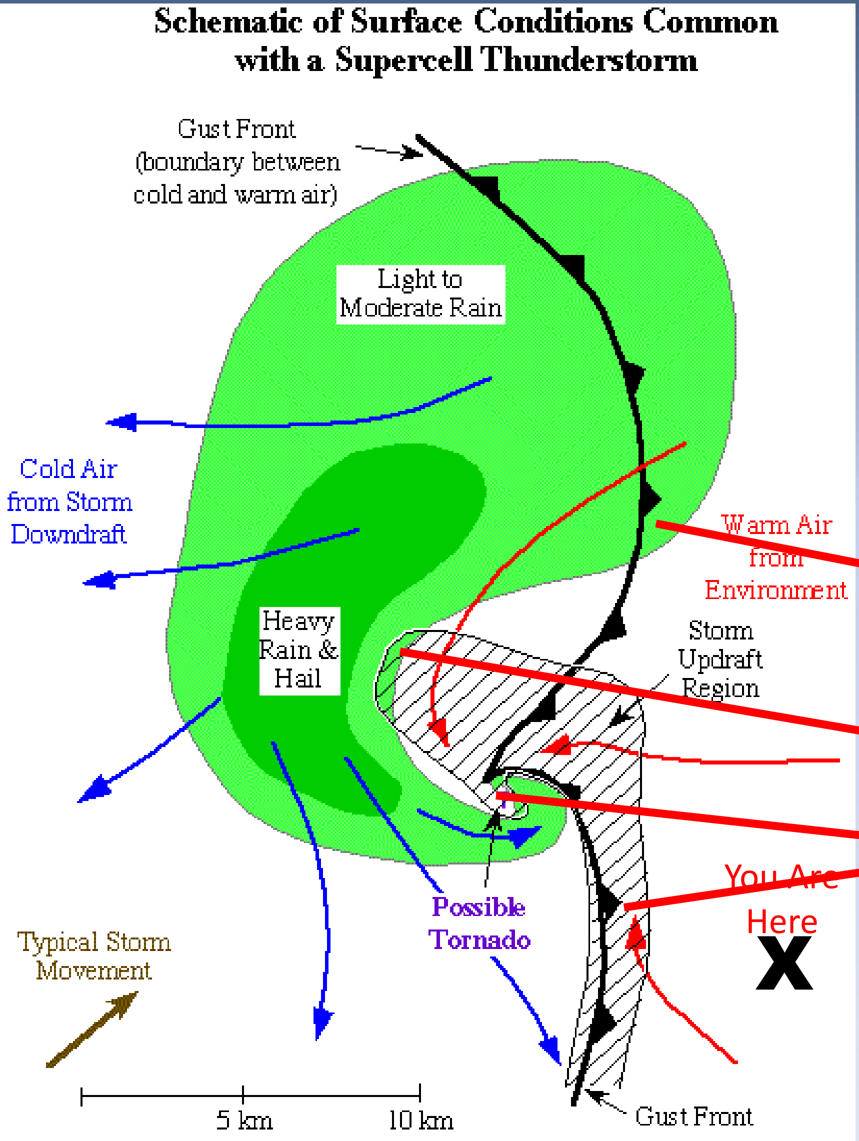
What We Observe When Spotting Large Hail



What We Observe When Spotting
Right Place - Right Time

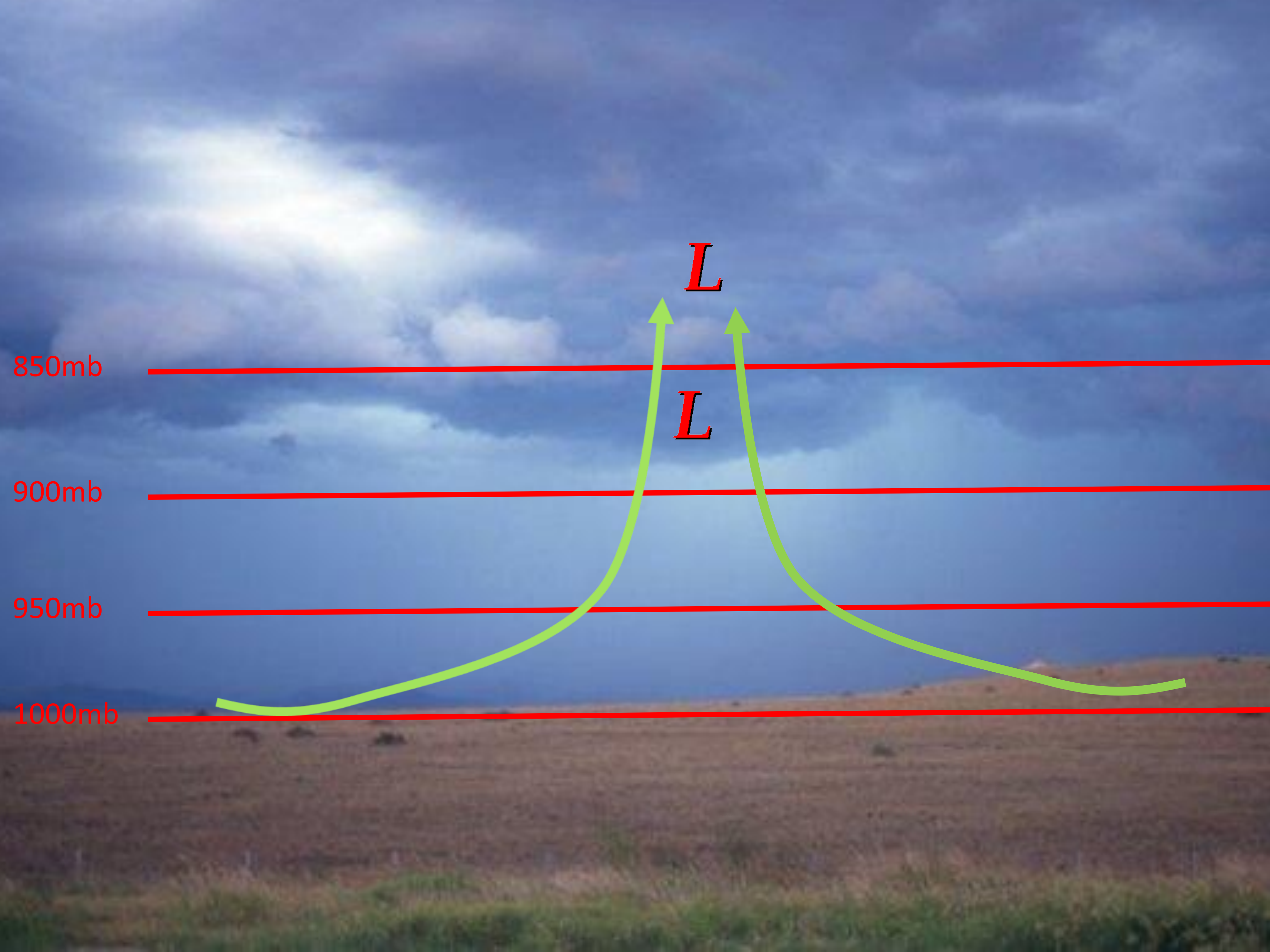


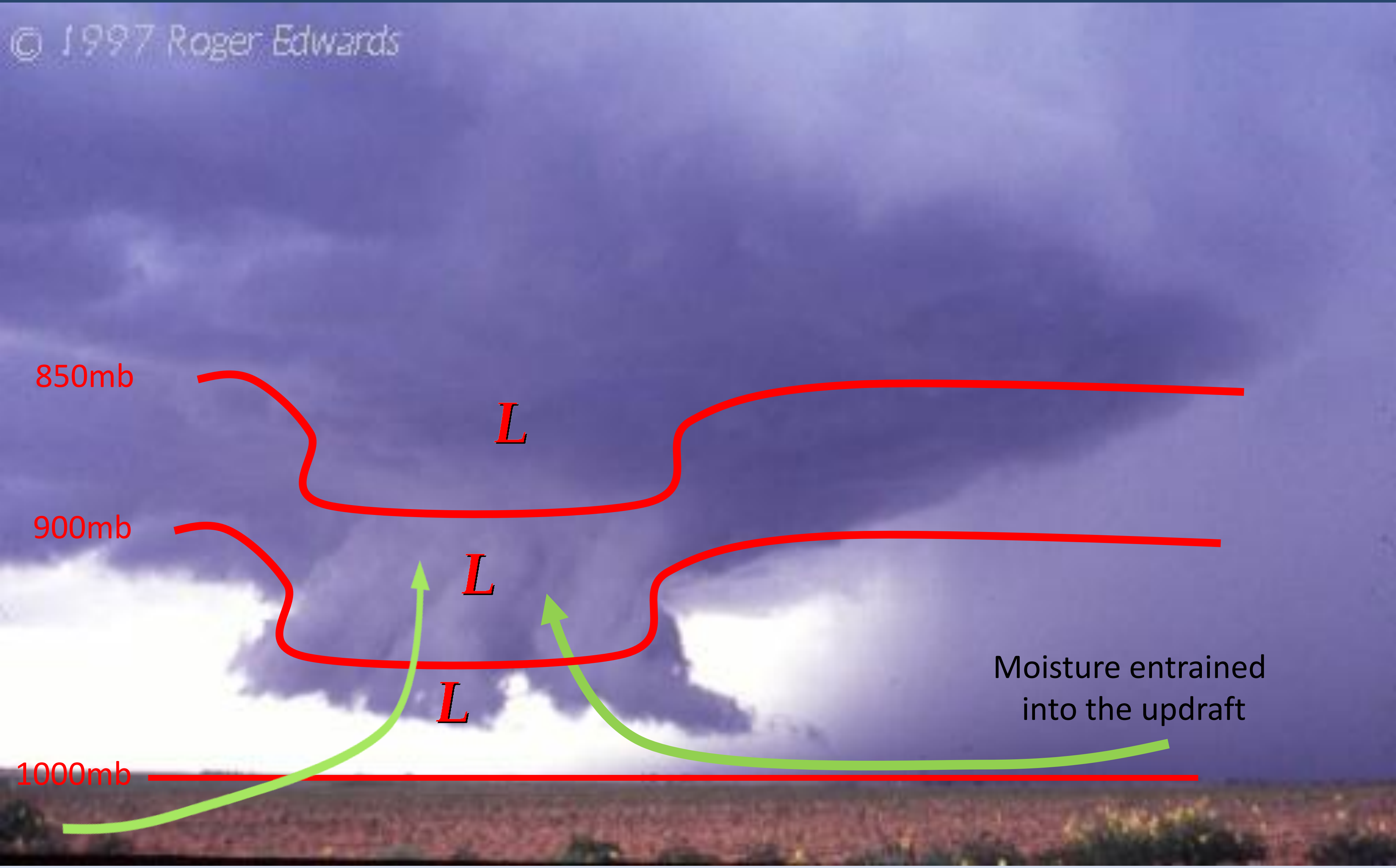
What We Observe When Spotting SuperCell



What We Observe When Spotting Wall Cloud

- A wall cloud is nothing more than the base of an updraft.
- Downward sloping towards the precipitation.
- Rotating!


L
850mb
L
900mb
950mb
1000mb



© 1997 Roger Edwards
850mb
L
900mb
L
L
1000mb
Moisture entrained
into the updraft

What We Observe When Spotting Shelf Cloud

- A shelf cloud is the leadings edge of a gust front that is moving out and away from the precipitation.
- Downward sloping away from the precipitation.
- Not rotating!


When the cool air from the downdraft reaches the surface....
... it creates the outflow which pushes forward and provides lift for clouds to form (along the black line.

What We Observe When Spotting
Quiz Time


©2000 Roger E


Example of a
W
E


© 2003 Andrew Revering


JUN 9 2006

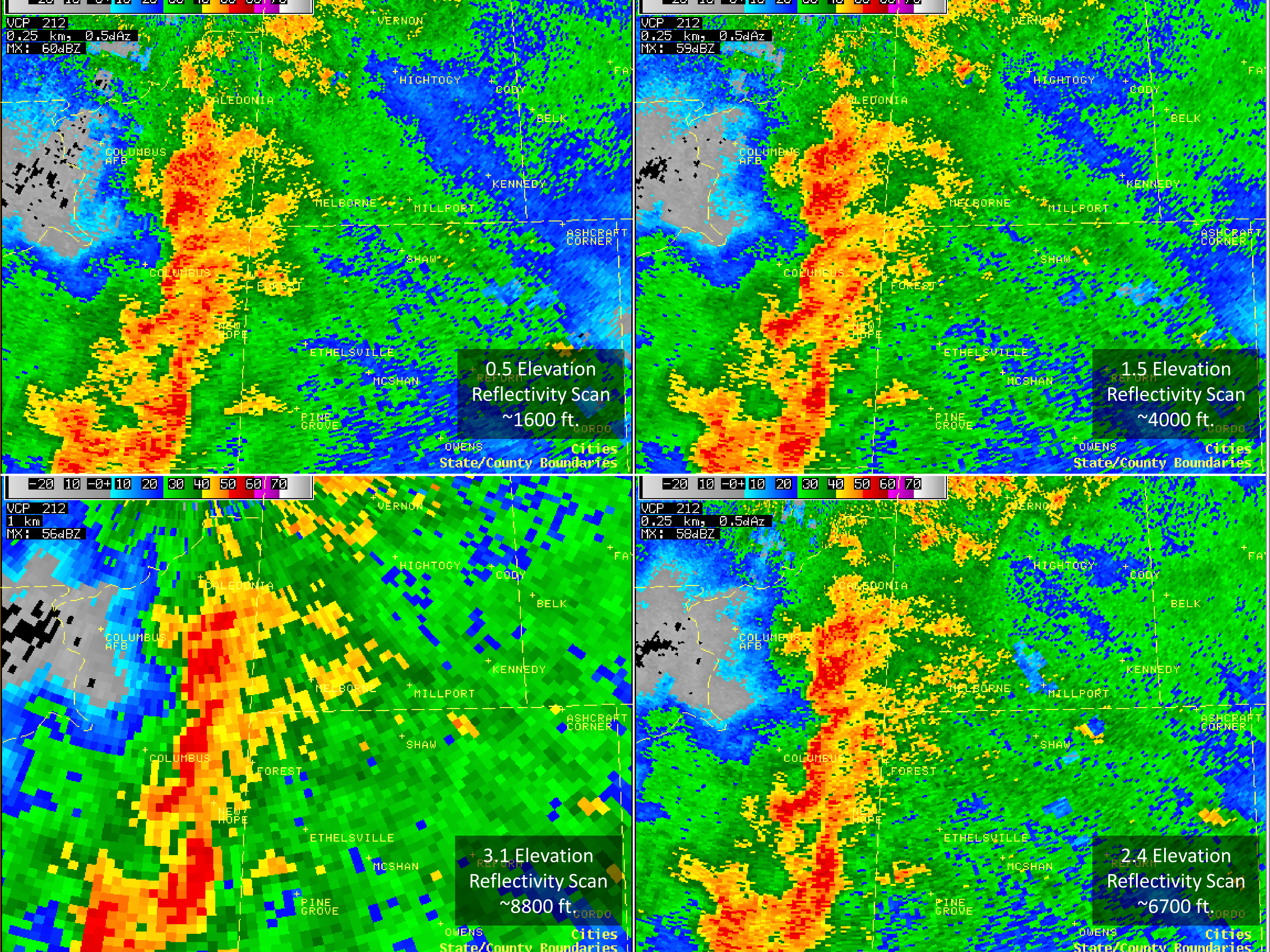
Courtesy of Jay Fowler

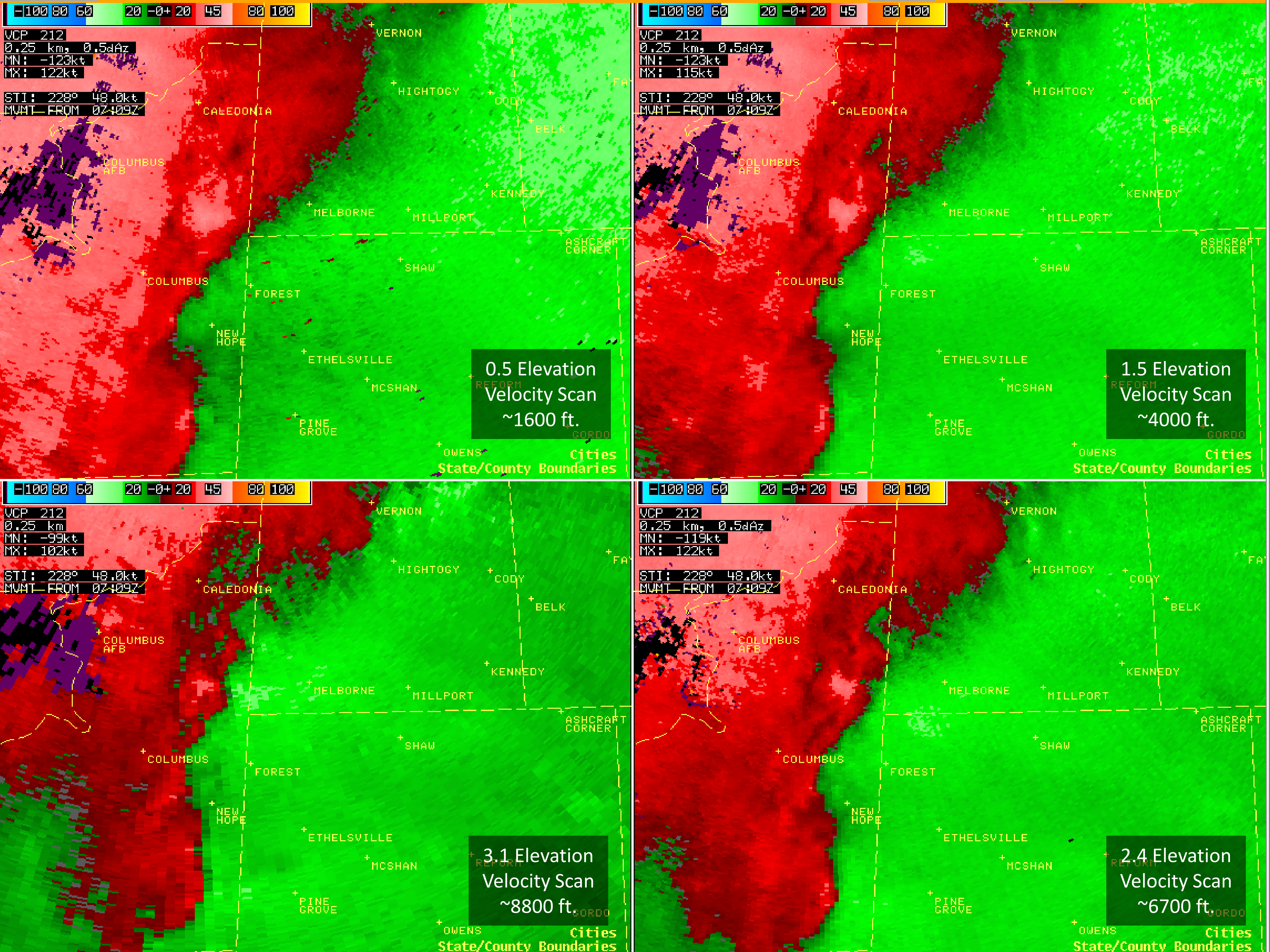

© 1999 Eric Nguyen

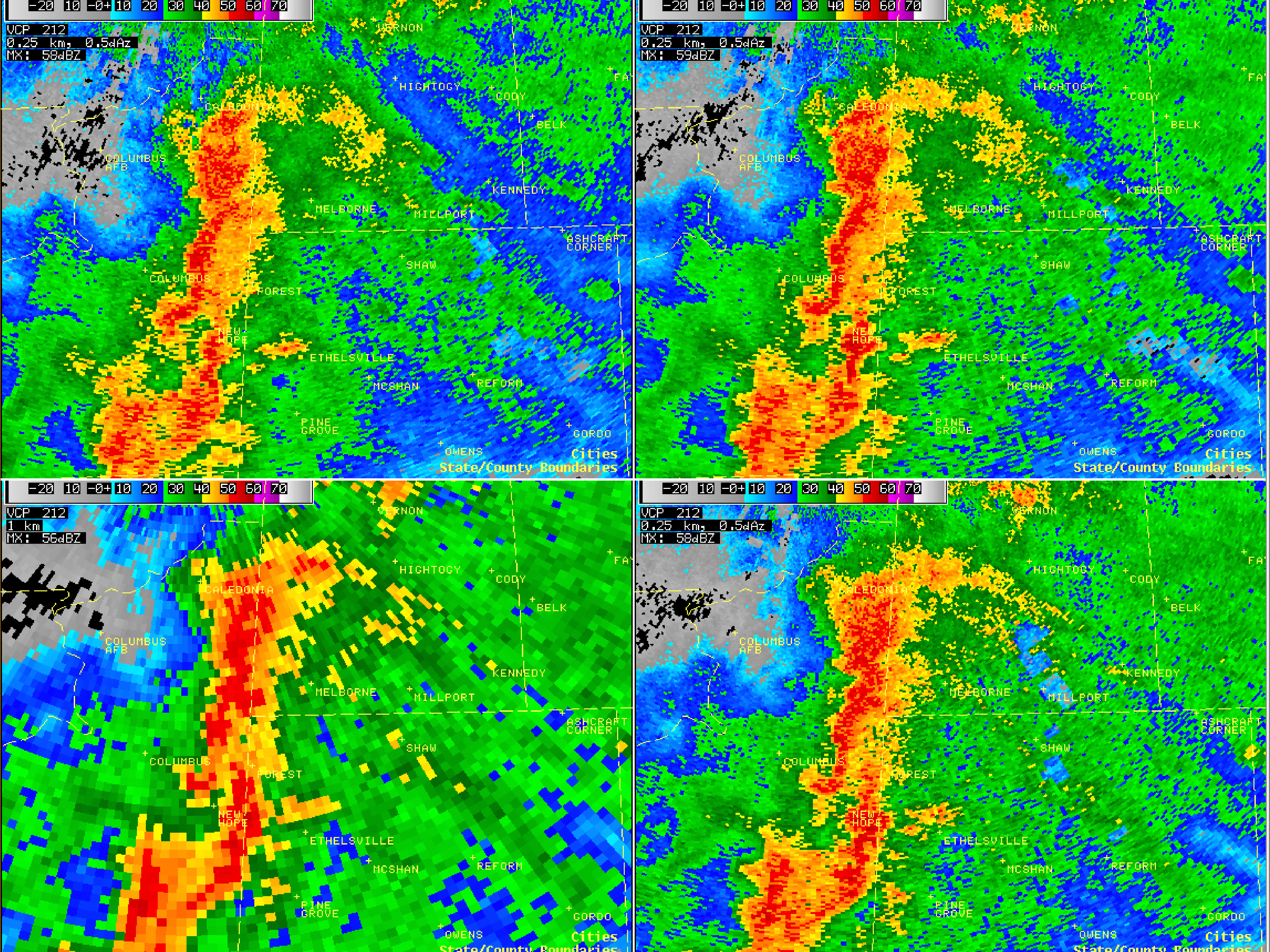

©www.Nightskyhunter.com

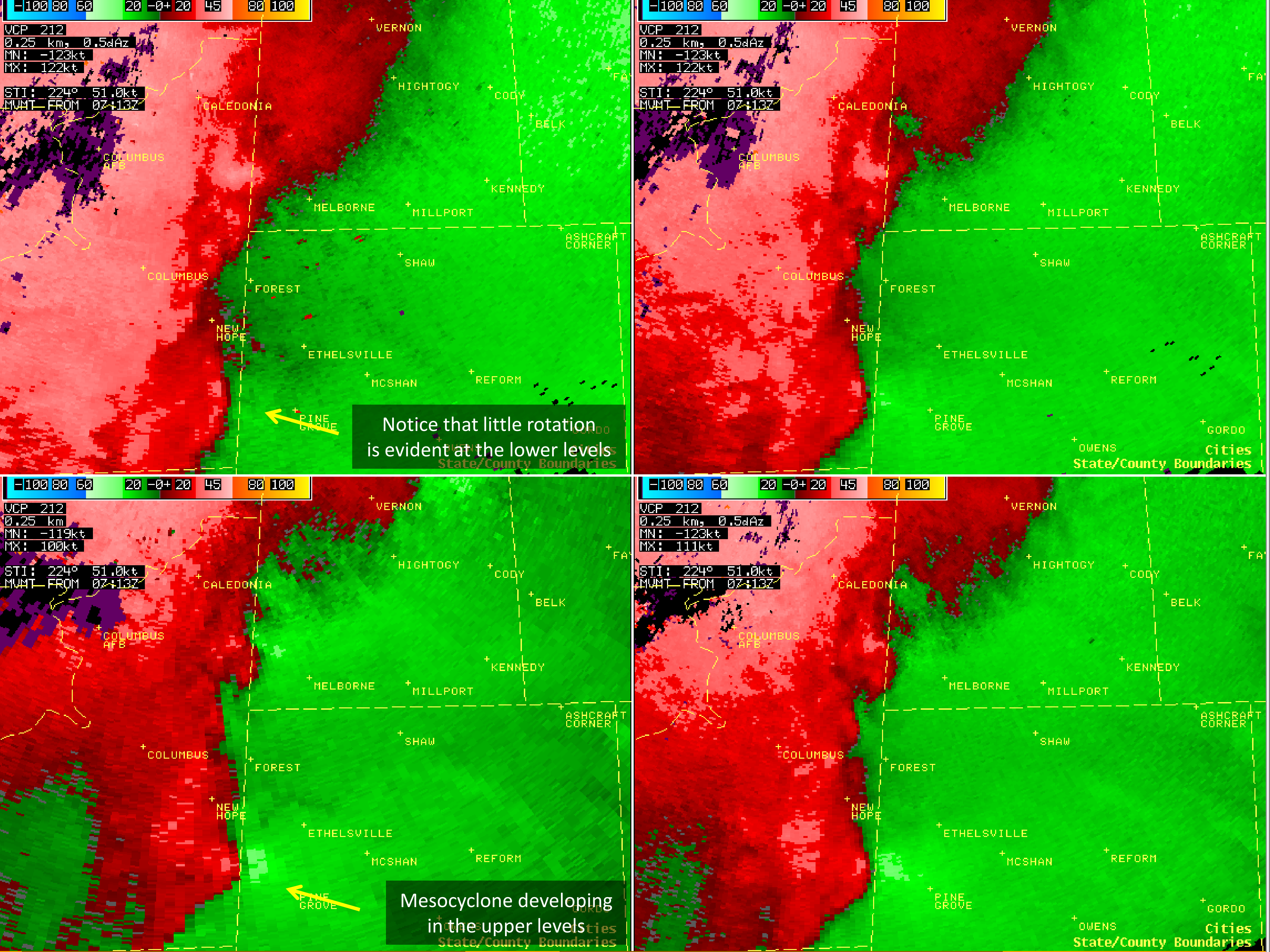
Warning Scenario

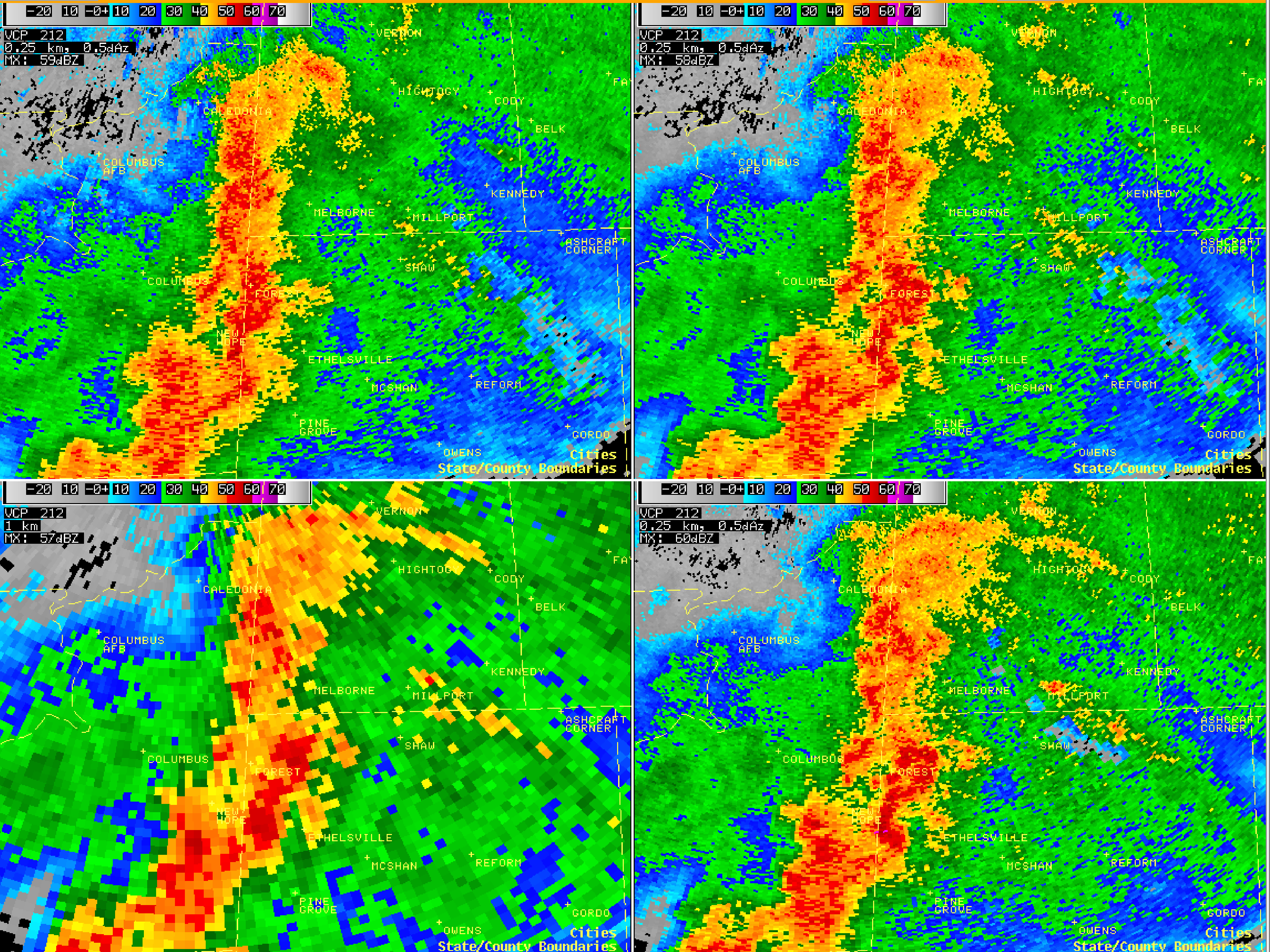
November 30, 2010


VCP 212
0.25 km, 0.5dAz
MX: 60dBZ
0.5 Elevation
Reflectivity Scan
~1600 ft.
VCP 212
0.25 km, 0.5dAz
MX: 59dBZ
1.5 Elevation
Reflectivity Scan
~4000 ft.
-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
1 km
MX: 56dBZ
3.1 Elevation
Reflectivity Scan
~8800 ft.
-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
0.25 km, 0.5dAz
MX: 58dBZ
2.4 Elevation
Reflectivity Scan
~6700 ft.
VERNON
HIGHTOGY
CODY
BELK
CALEDONIA
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
PINE GROVE
OWENS
GORDO
REFORM
Cities
State/County Boundaries

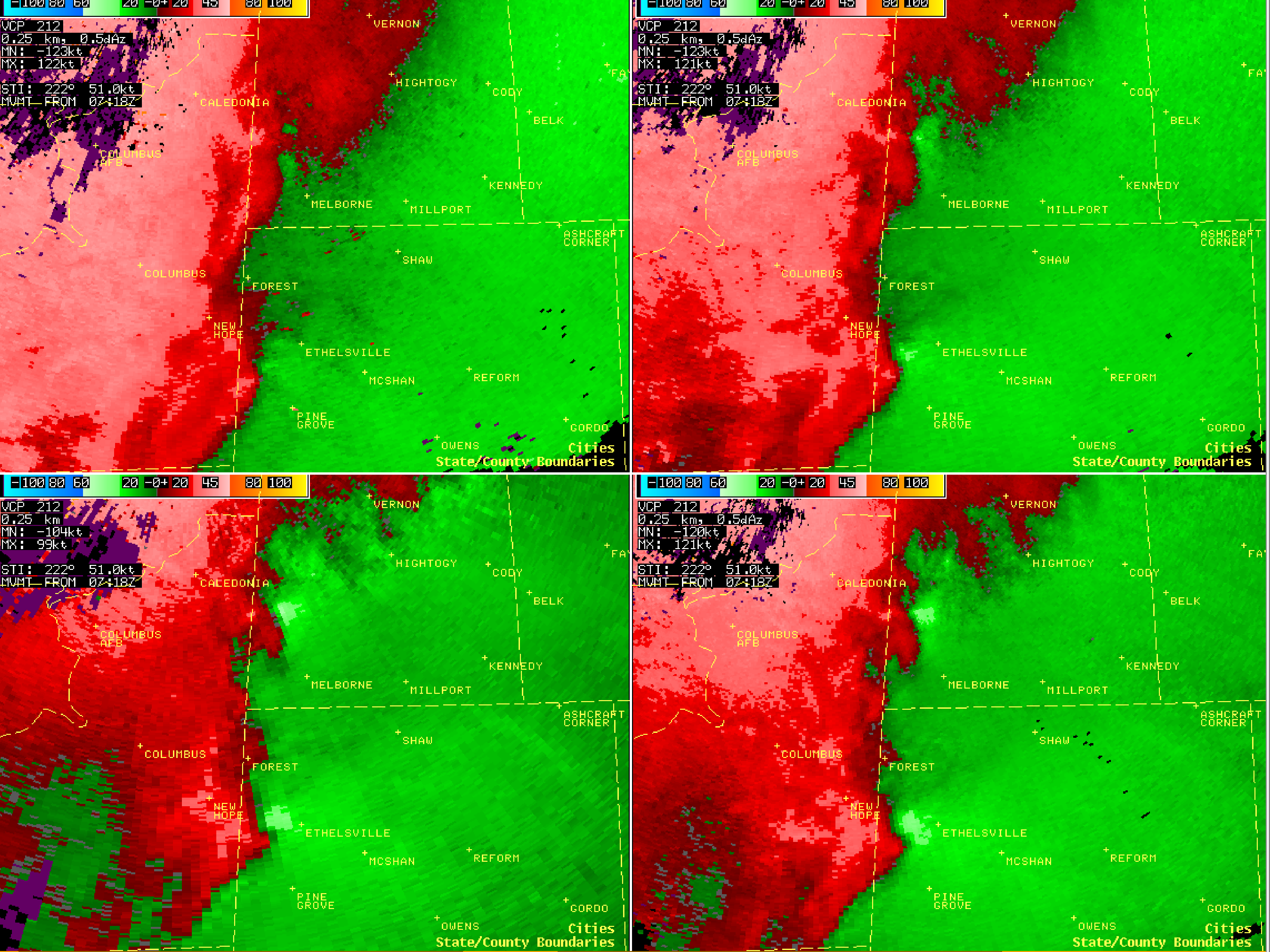

-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km, 0.5dAz
MN: -123kt
MX: 122kt
STI: 228° 48.0kt
MVMT FROM 07:09Z
VERNON
HIGHTOGY
CODY
BELK
CALEDONIA
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
PINE GROVE
OWENS
REFORM
GORDO
Cities
State/County Boundaries
0.5 Elevation
Velocity Scan
~1600 ft.
MN: -123kt
MX: 115kt
1.5 Elevation
Velocity Scan
~4000 ft.
0.25 km
MN: -99kt
MX: 102kt
3.1 Elevation
Velocity Scan
~8800 ft.
MN: -119kt
MX: 122kt
2.4 Elevation
Velocity Scan
~6700 ft.

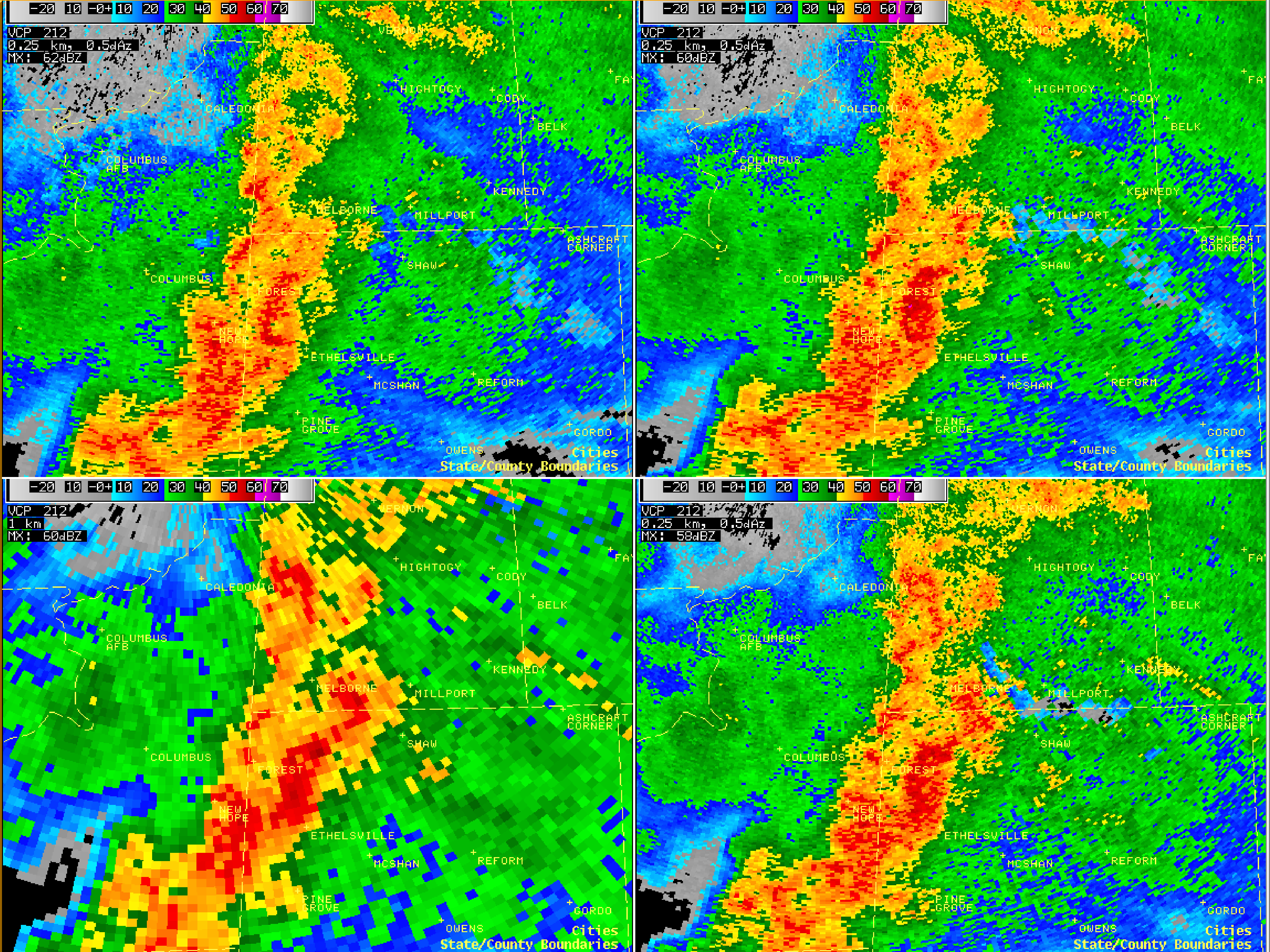

-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
0.25 km, 0.5dAz
MX: 58dBZ
VERNON
HIGHTOGY
CODY
CALEDONIA
BELK
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries
-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
0.25 km, 0.5dAz
MX: 59dBZ
-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
1 km
MX: 56dBZ
-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
0.25 km, 0.5dAz
MX: 58dBZ

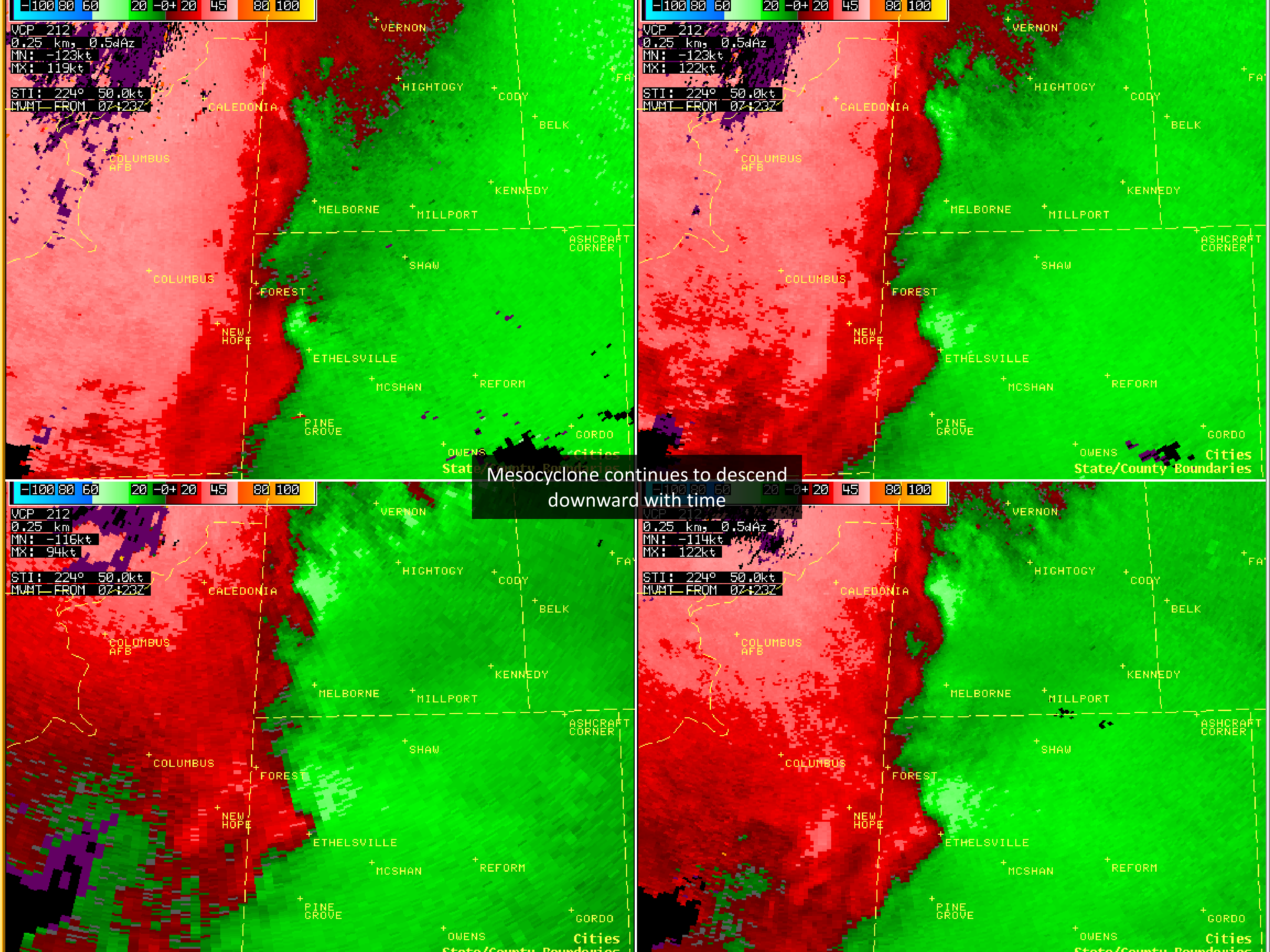

VCP 212
0.25 km, 0.5dAz
MN: -123kt
MX: 122kt
STI: 224° 51.0kt
MVMT FROM 07:13Z
Notice that little rotation is evident at the lower levels
VCP 212
0.25 km
MN: -119kt
MX: 100kt
STI: 224° 51.0kt
MVMT FROM 07:13Z
Mesocyclone developing in the upper levels
VCP 212
0.25 km, 0.5dAz
MN: -123kt
MX: 111kt
STI: 224° 51.0kt
MVMT FROM 07:13Z
Cities
State/County Boundaries

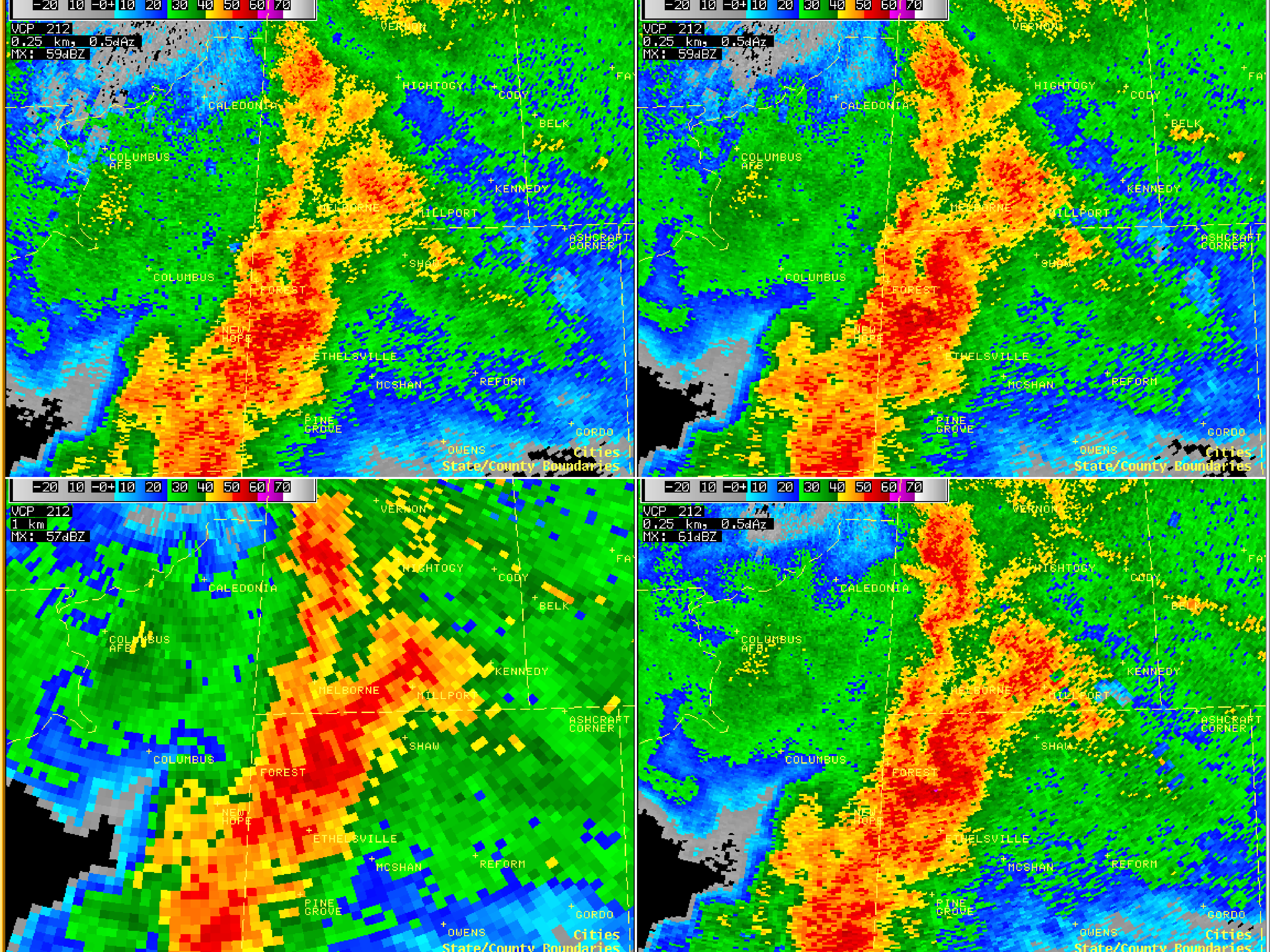


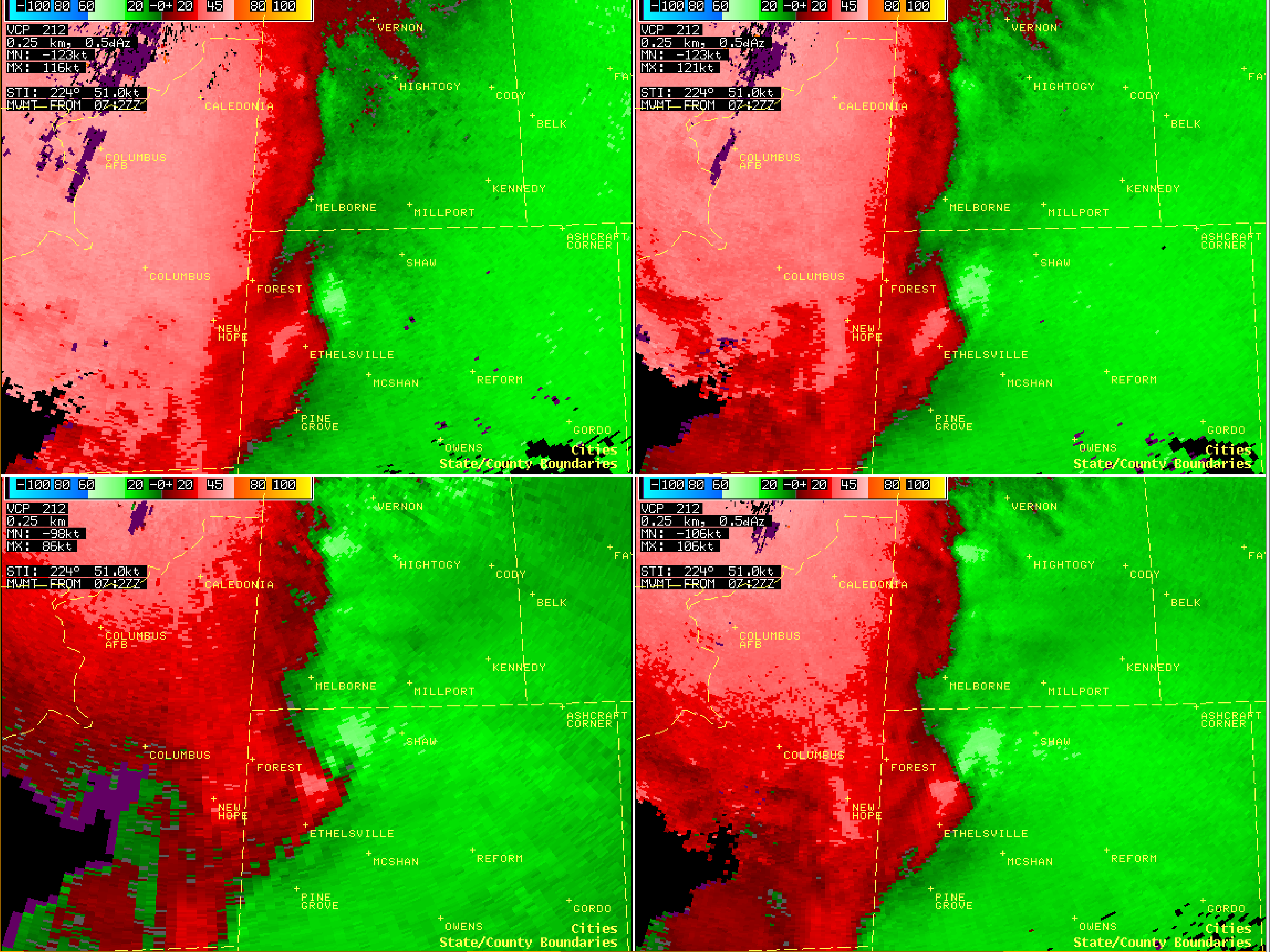
-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
0.25 km, 0.5dAz
MX: 59dBZ
VERNON
HIGHTOGY
CODY
FA
CALEDONIA
BELK
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries
-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
0.25 km, 0.5dAz
MX: 58dBZ
-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
1 km
MX: 57dBZ
-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
0.25 km, 0.5dAz
MX: 60dBZ

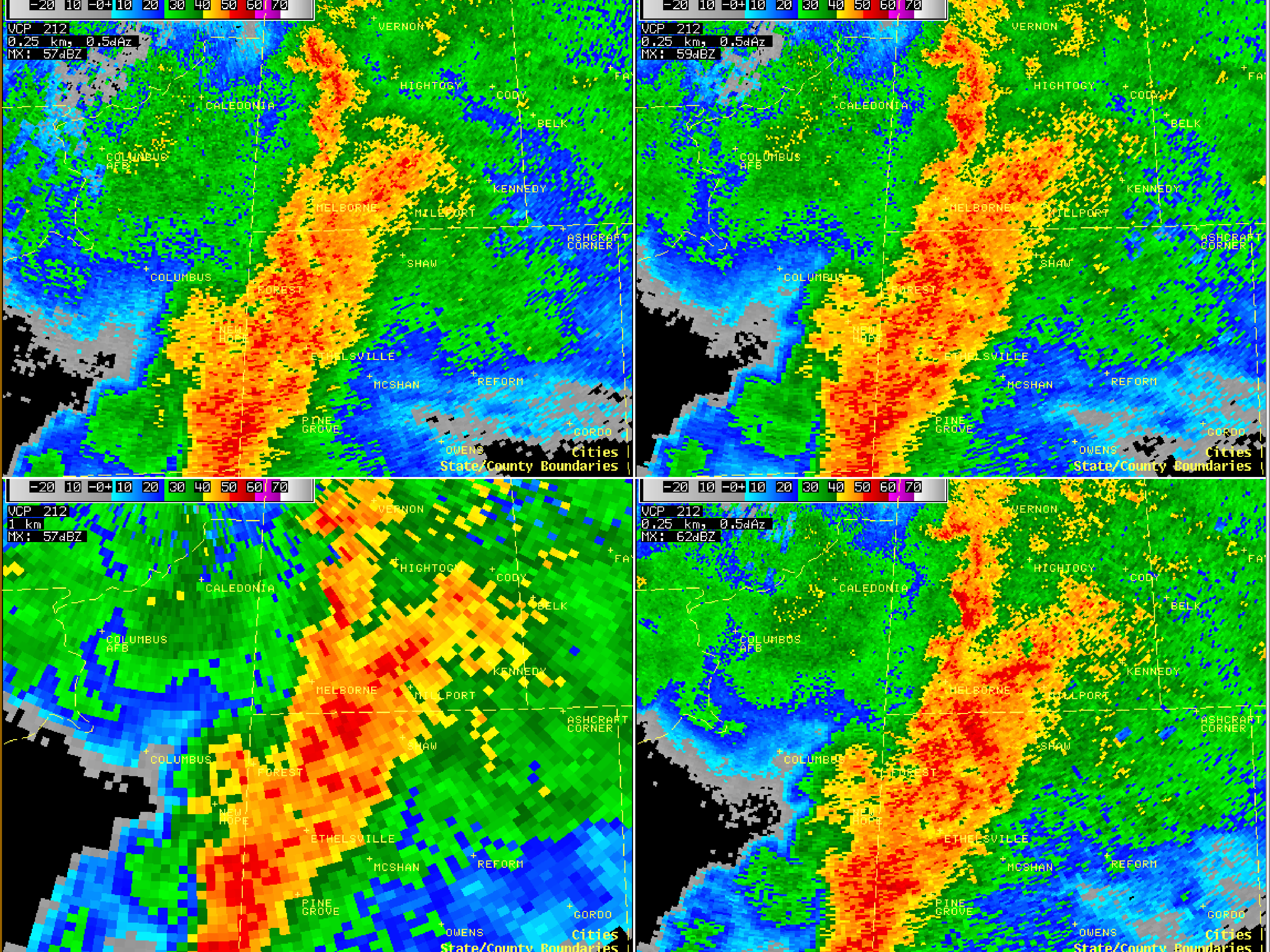

-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km, 0.5dAz
MN: -123kt
MX: 122kt
STI: 222° 51.0kt
MVMT FROM 07:18Z
VERNON
HIGHTOGY
CODY
CALEDONIA
BELK
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries
VCP 212
0.25 km, 0.5dAz
MN: -123kt
MX: 121kt
STI: 222° 51.0kt
MVMT FROM 07:18Z
VCP 212
0.25 km
MN: -104kt
MX: 99kt
STI: 222° 51.0kt
MVMT FROM 07:18Z
VCP 212
0.25 km, 0.5dAz
MN: -120kt
MX: 121kt
STI: 222° 51.0kt
MVMT FROM 07:18Z

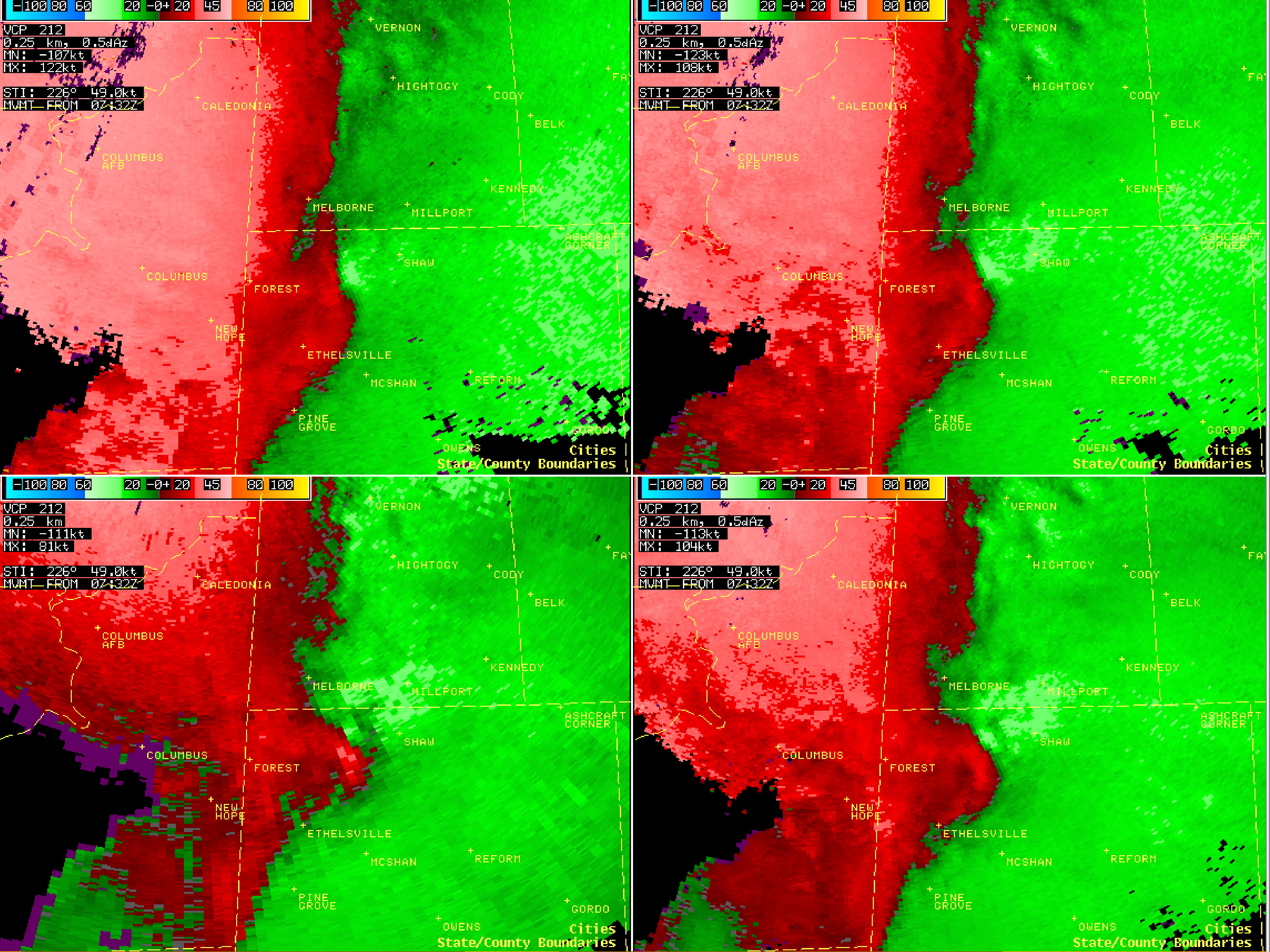

-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
0.25 km, 0.5dAz
MX: 62dBZ
VCP 212
0.25 km, 0.5dAz
MX: 60dBZ
VCP 212
1 km
MX: 60dBZ
VCP 212
0.25 km, 0.5dAz
MX: 58dBZ
VERNON
HIGHTOGY
CODY
FA
BELK
CALEDONIA
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries

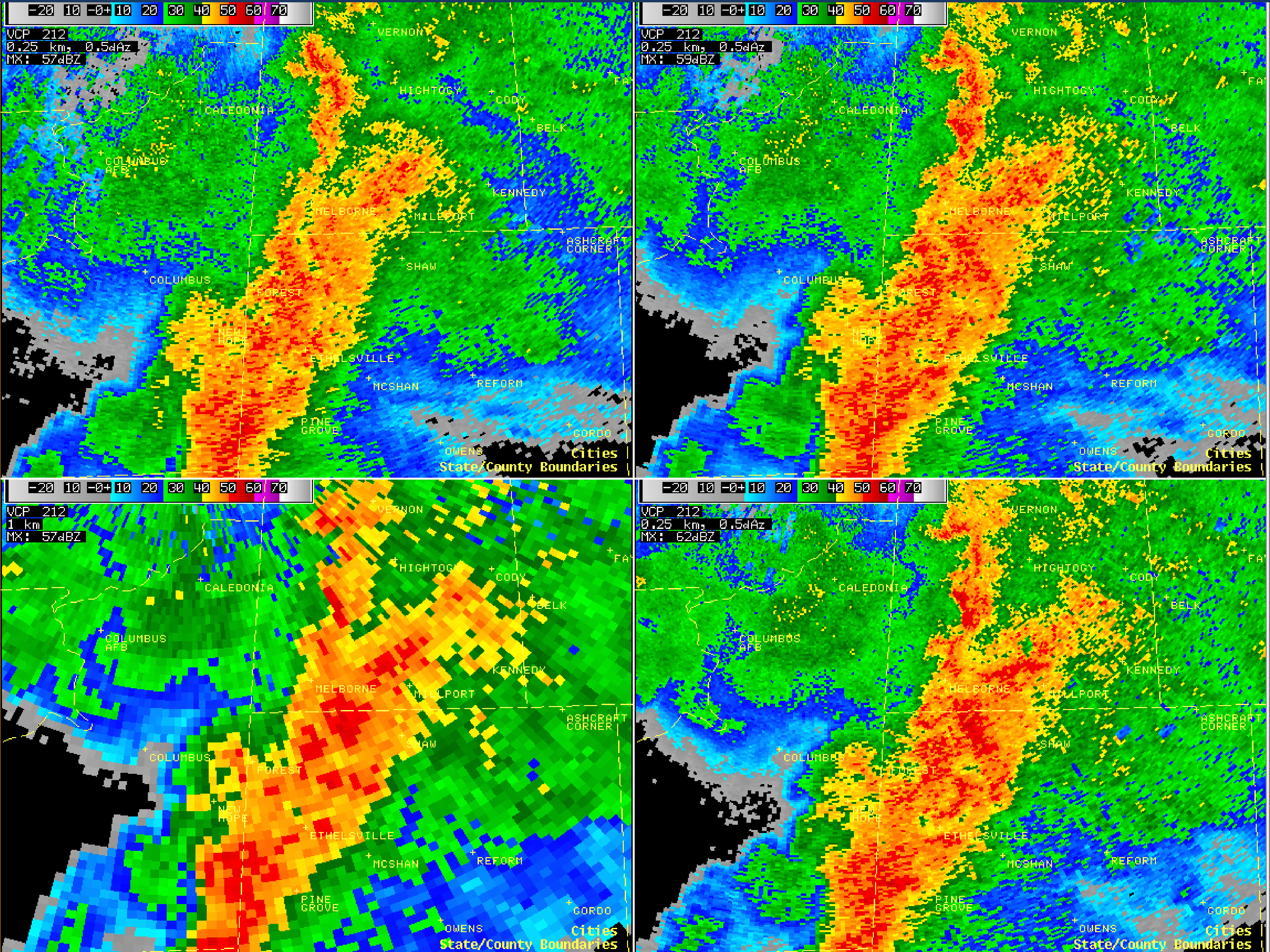

Mesocyclone continues to descend downward with time
-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km, 0.5dAz
MN: -123kt
MX: 119kt
STI: 224° 50.0kt
MVMT FROM 07:23Z
VERNON
HIGHTOGY
CODY
BELK
CALEDONIA
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries
MN: -123kt
MX: 122kt
MN: -116kt
MX: 94kt
MN: -114kt
MX: 122kt

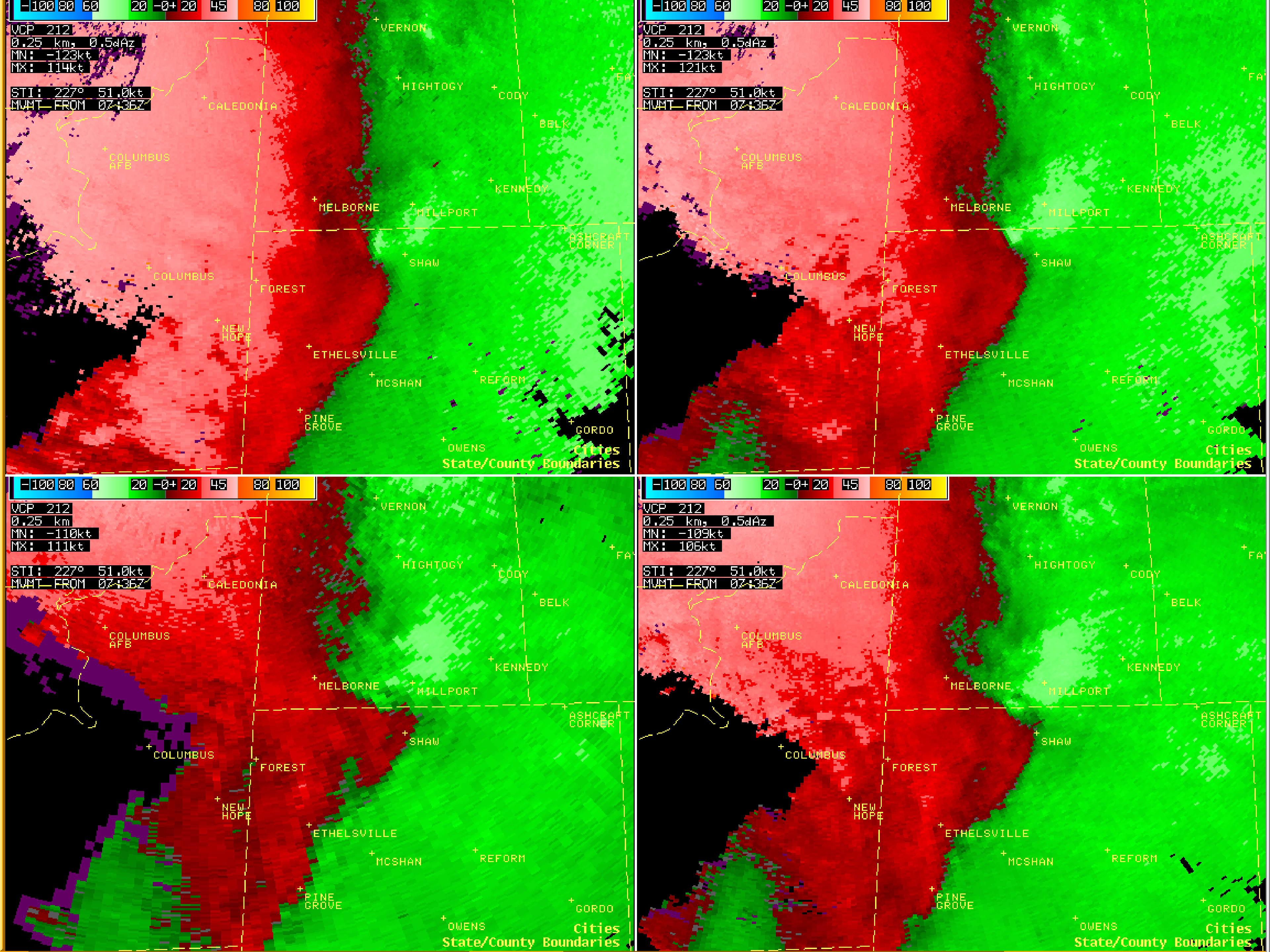

-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
0.25 km, 0.5dAz
MX: 59dBZ
VERNON
HIGHTOGY
CODY
FA
CALEDONIA
BELK
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries
-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
0.25 km, 0.5dAz
MX: 59dBZ
-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
1 km
MX: 57dBZ
-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
0.25 km, 0.5dAz
MX: 61dBZ

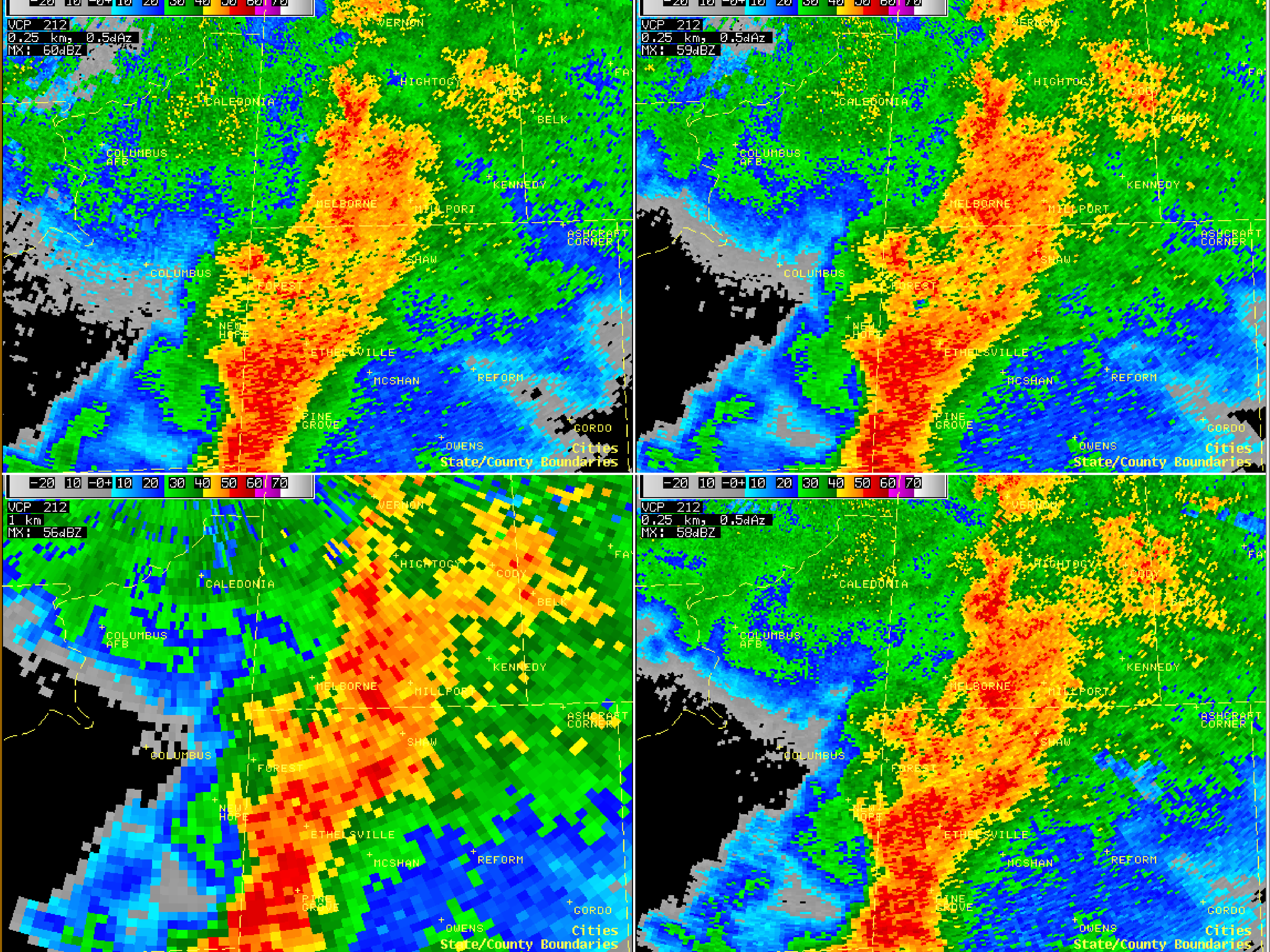

-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km, 0.5dAz
MN: -123kt
MX: 116kt
STI: 224° 51.0kt
MVMT FROM 07:27Z
VCP 212
0.25 km, 0.5dAz
MN: -123kt
MX: 121kt
STI: 224° 51.0kt
MVMT FROM 07:27Z
VCP 212
0.25 km
MN: -98kt
MX: 86kt
STI: 224° 51.0kt
MVMT FROM 07:27Z
VCP 212
0.25 km, 0.5dAz
MN: -106kt
MX: 106kt
STI: 224° 51.0kt
MVMT FROM 07:27Z
VERNON
HIGHTOGY
CODY
FA
CALEDONIA
BELK
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries


-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
0.25 km, 0.5dAz
MX: 57dBZ
VCP 212
0.25 km, 0.5dAz
MX: 59dBZ
VCP 212
1 km
MX: 57dBZ
VCP 212
0.25 km, 0.5dAz
MX: 62dBZ
VERNON
HIGHTOGY
CODY
CALEDONIA
BELK
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries

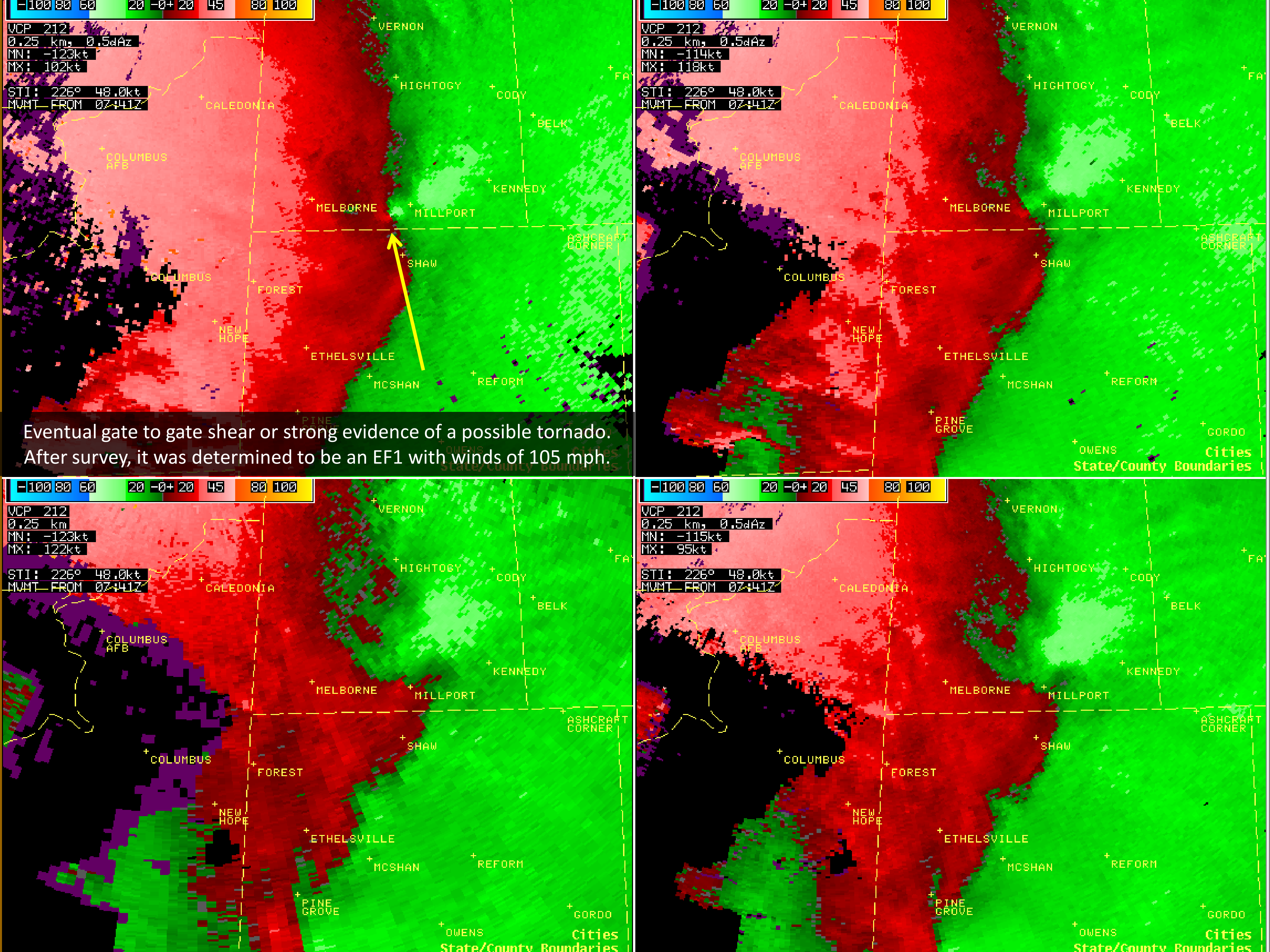

-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km, 0.5dAz
MN: -107kt
MX: 122kt
STI: 226° 49.0kt
MVMT FROM 07:32Z
VERNON
HIGHTOGY
CODY
BELK
CALEDONIA
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries
-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km, 0.5dAz
MN: -123kt
MX: 108kt
STI: 226° 49.0kt
MVMT FROM 07:32Z
VERNON
HIGHTOGY
CODY
BELK
CALEDONIA
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries
-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km
MN: -111kt
MX: 81kt
STI: 226° 49.0kt
MVMT FROM 07:32Z
VERNON
HIGHTOGY
CODY
BELK
CALEDONIA
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries
-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km, 0.5dAz
MN: -113kt
MX: 104kt
STI: 226° 49.0kt
MVMT FROM 07:32Z
VERNON
HIGHTOGY
CODY
BELK
CALEDONIA
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries

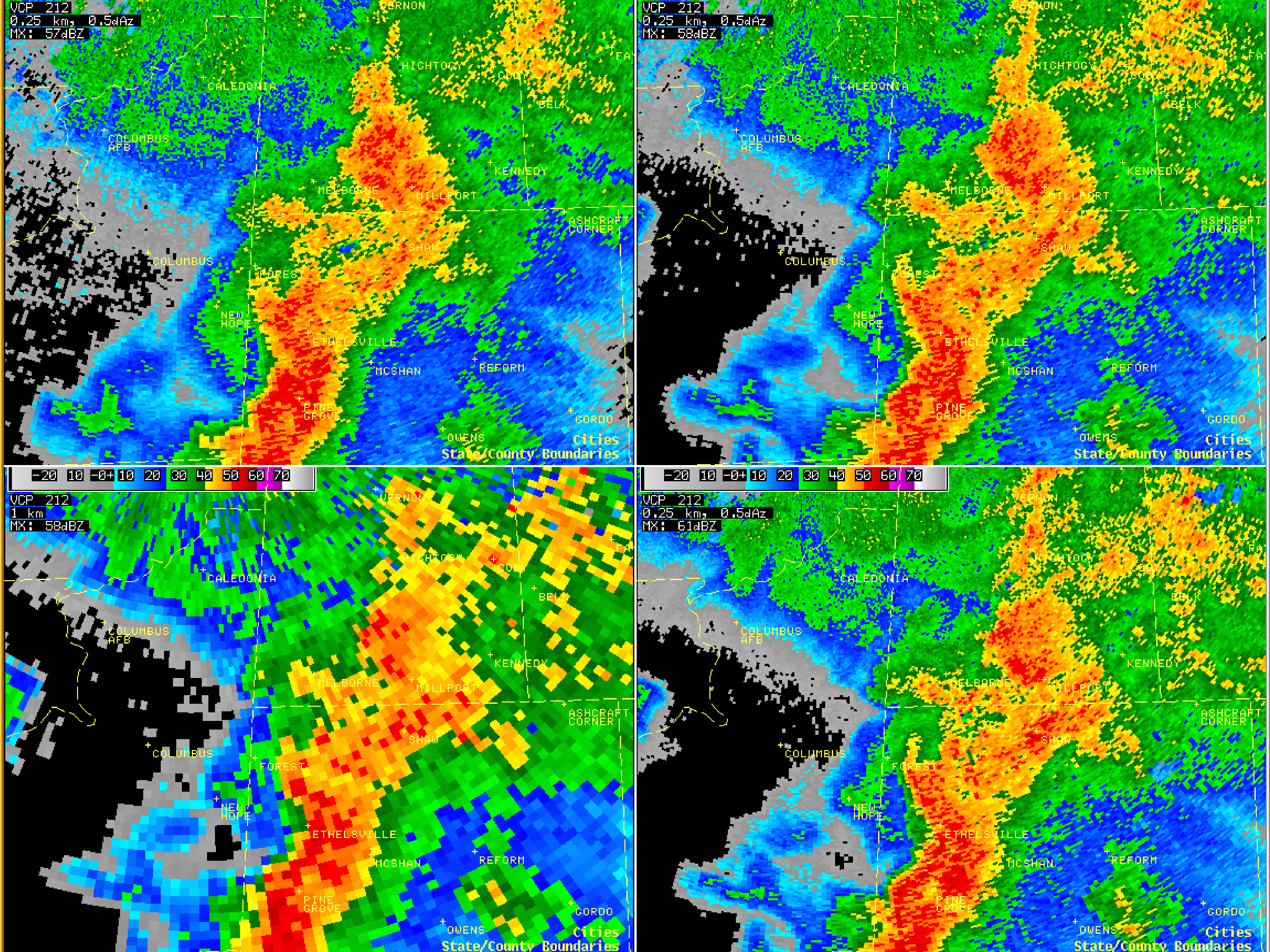

-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
0.25 km, 0.5dAz
MX: 57dBZ
VCP 212
0.25 km, 0.5dAz
MX: 59dBZ
VCP 212
1 km
MX: 57dBZ
VCP 212
0.25 km, 0.5dAz
MX: 62dBZ
VERNON
HIGHTOGY
CODY
CALEDONIA
BELK
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries


-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km, 0.5dAz
MN: -123kt
MX: 114kt
STI: 227° 51.0kt
MVMT FROM 07:36Z
VERNON
HIGHTOGY
CODY
CALEDONIA
BELK
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries
-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km, 0.5dAz
MN: -123kt
MX: 121kt
STI: 227° 51.0kt
MVMT FROM 07:36Z
-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km
MN: -110kt
MX: 111kt
STI: 227° 51.0kt
MVMT FROM 07:36Z
-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km, 0.5dAz
MN: -109kt
MX: 106kt
STI: 227° 51.0kt
MVMT FROM 07:36Z

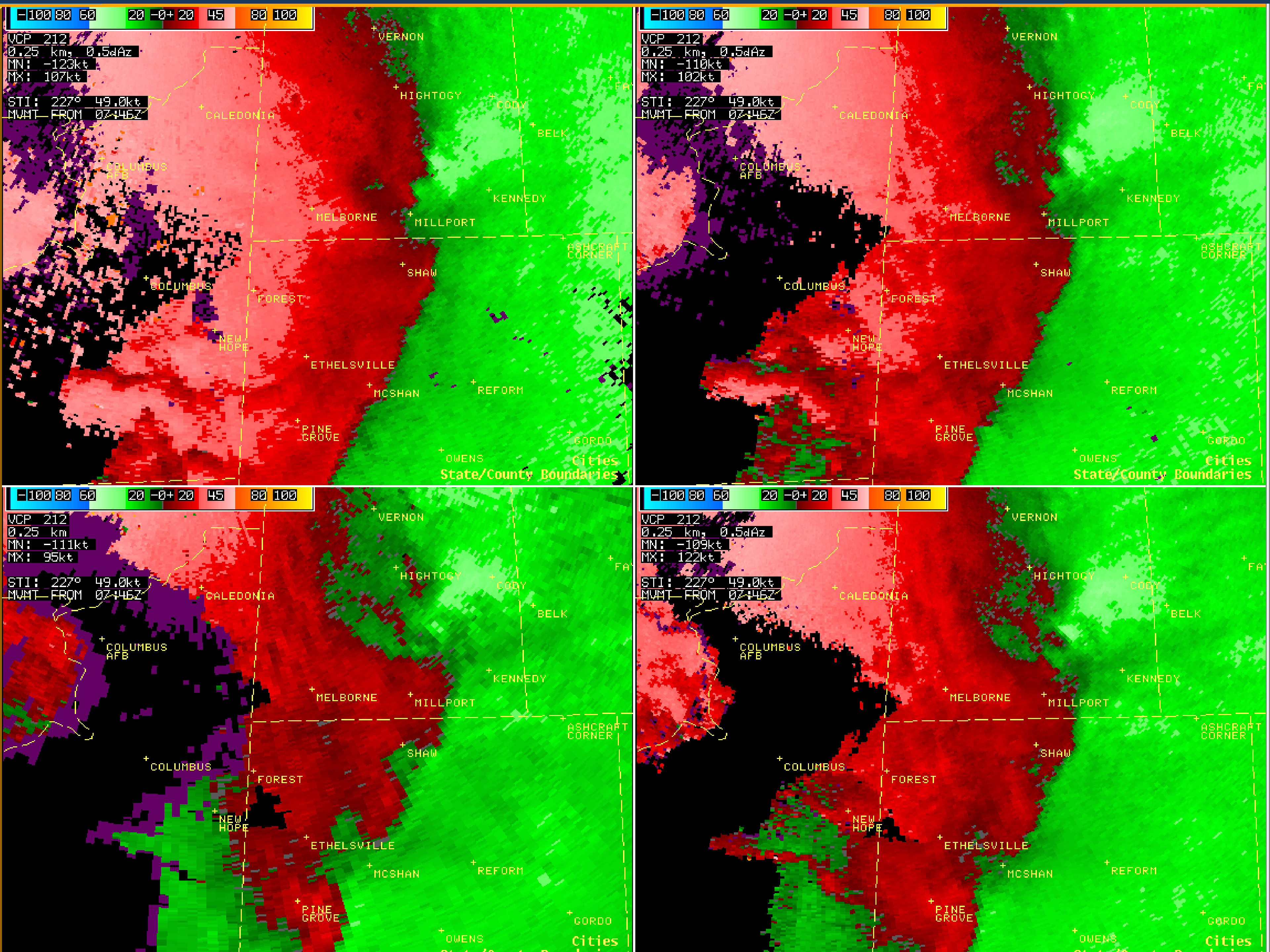


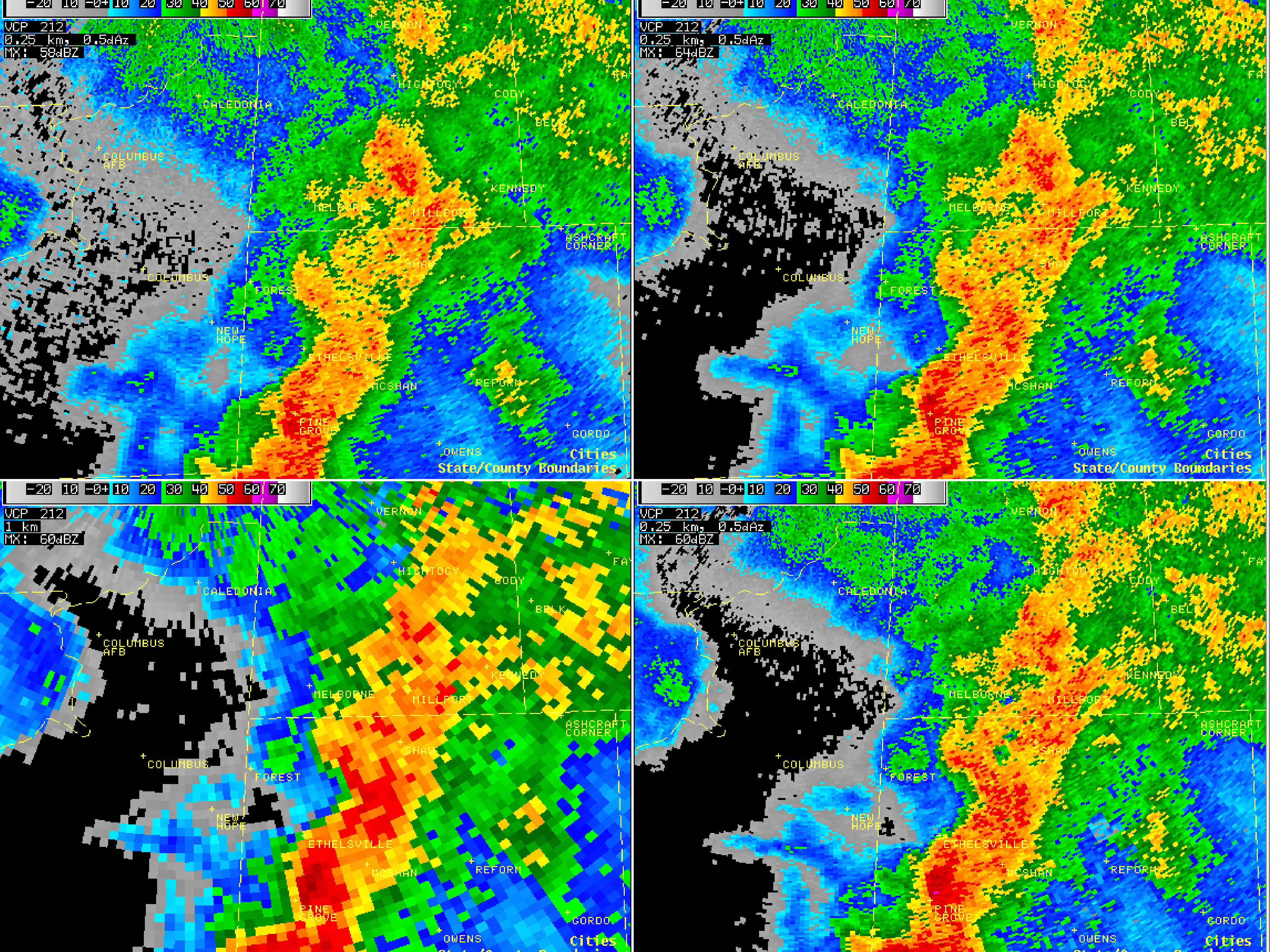
-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
0.25 km, 0.5dAz
MX: 60dBZ
VCP 212
0.25 km, 0.5dAz
MX: 59dBZ
VCP 212
1 km
MX: 56dBZ
VCP 212
0.25 km, 0.5dAz
MX: 58dBZ
VERNON
HIGHTOGY
CALEDONIA
CODY
BELK
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries


VCP 212
0.25 km, 0.5dAz
MN: -123kt
MX: 102kt
STI: 226° 48.0kt
MVMT FROM 07:41Z
VERNON
HIGHTOGY
CODY
BELK
CALEDONIA
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
OWENS
GORDO
Cities
State/County Boundaries
Eventual gate to gate shear or strong evidence of a possible tornado.
After survey, it was determined to be an EF1 with winds of 105 mph.

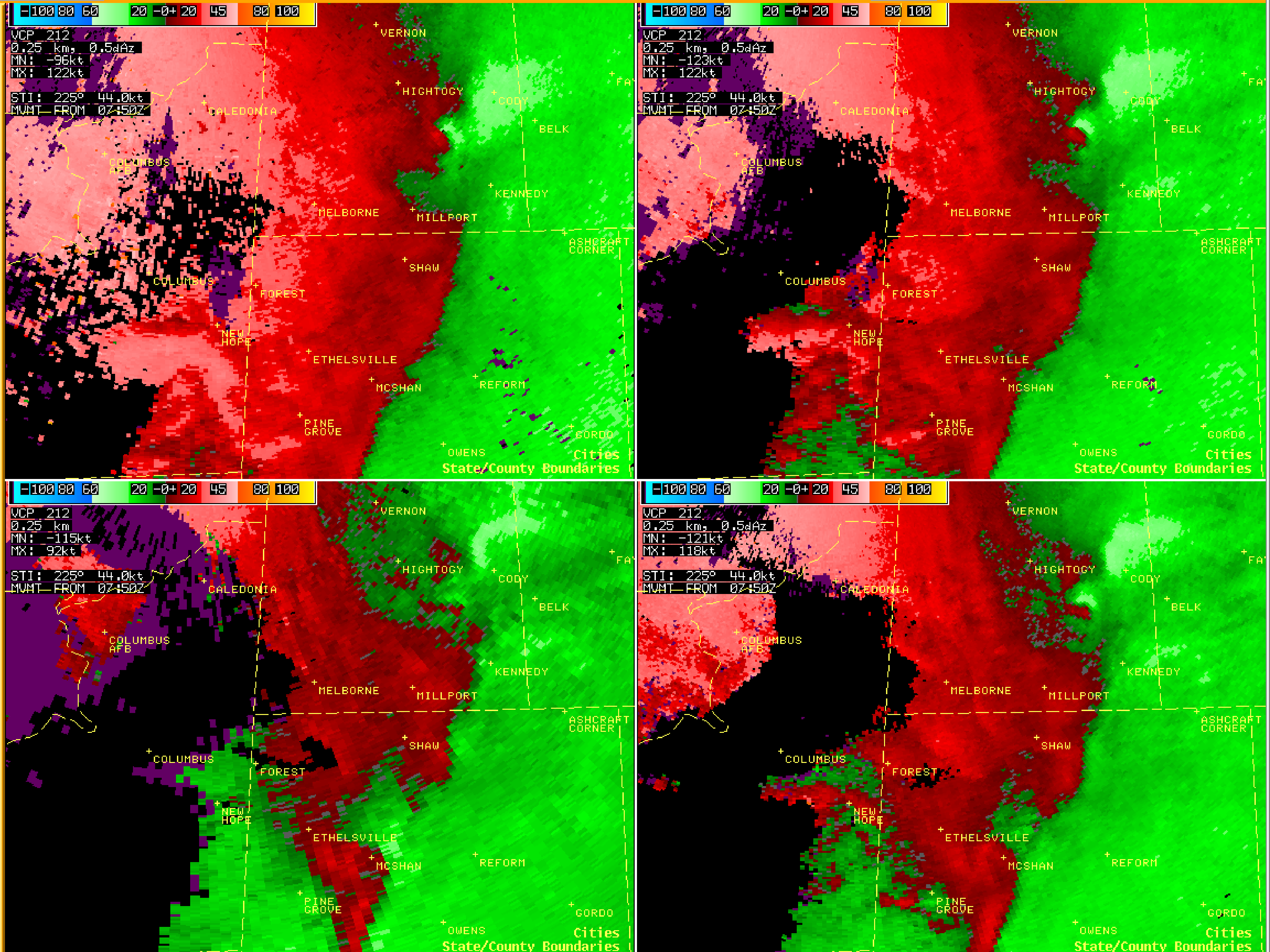


VCP 212
0.25 km, 0.5dAz
MX: 57dBZ
VERNON
CALEDONIA
COLUMBUS AFB
BELK
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries
VCP 212
0.25 km, 0.5dAz
MX: 58dBZ
-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
1 km
MX: 58dBZ
-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
0.25 km, 0.5dAz
MX: 61dBZ


-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km, 0.5dAz
MN: -123kt
MX: 107kt
STI: 227° 49.0kt
MVMT FROM 07:46Z
VERNON
HIGHTOGY
CODY
FA
BELK
CALEDONIA
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries
-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km, 0.5dAz
MN: -110kt
MX: 102kt
STI: 227° 49.0kt
MVMT FROM 07:46Z
Cities
State/County Boundaries
-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km
MN: -111kt
MX: 95kt
STI: 227° 49.0kt
MVMT FROM 07:46Z
Cities
-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km, 0.5dAz
MN: -109kt
MX: 122kt
STI: 227° 49.0kt
MVMT FROM 07:46Z
Cities



-20 10 -0+ 10 20 30 40 50 60 70
VCP 212
0.25 km, 0.5dAz
MX: 58dBZ
VERNON
CODY
CALEDONIA
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries
VCP 212
0.25 km, 0.5dAz
MX: 64dBZ
VCP 212
1 km
MX: 60dBZ
VCP 212
0.25 km, 0.5dAz
MX: 60dBZ


-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km, 0.5dAz
MN: -96kt
MX: 122kt
STI: 225° 44.0kt
MVMT FROM 07:50Z
VERNON
HIGHTOGY
CODY
CALEDONIA
BELK
COLUMBUS AFB
KENNEDY
MELBORNE
MILLPORT
ASHCRAFT CORNER
SHAW
COLUMBUS
FOREST
NEW HOPE
ETHELSVILLE
MCSHAN
REFORM
PINE GROVE
GORDO
OWENS
Cities
State/County Boundaries
-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km, 0.5dAz
MN: -123kt
MX: 122kt
STI: 225° 44.0kt
MVMT FROM 07:50Z
-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km
MN: -115kt
MX: 92kt
STI: 225° 44.0kt
MVMT FROM 07:50Z
-100 80 60 20 -0+ 20 45 80 100
VCP 212
0.25 km, 0.5dAz
MN: -121kt
MX: 118kt
STI: 225° 44.0kt
MVMT FROM 07:50Z

Questions or Comments?

1-800-856-0758

Email:

John DeBlock – john.deblock@noaa.gov

Kevin Laws – kevin.laws@noaa.gov

A survey will follow this presentation, please submit feedback so we can improve this presentation!

U.S. Department of Commerce

National Oceanic and Atmospheric Administration

National Weather Service – Birmingham, AL